



Civil 3D for Project Managers

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What is Civil 3D?

Civil 3D is an engineering software application used by civil engineers and other professionals to plan, design, and manage civil engineering projects.

These projects fall under the three main categories of land development, water, and transportation projects; and can include construction area development, road engineering, river development, port construction, canals, dams, embankments, and many others.

Civil 3D allows is **used to create three-dimensional (3D) models** of land, water, or transportation features while **maintaining dynamic relationships to source data such as grading objects, breaklines, contours, and corridors.**

As an industry-leading building information modeling (BIM) solution, Civil 3D is well known in the civil engineering community and widely used on a variety of infrastructure projects both large and small.

What are the benefits of using Civil 3D?

Civil engineers who are currently using AutoCAD or plan on learning AutoCAD will inherit many benefits of using Civil 3D. Civil 3D was originally created to be an add-on for AutoCAD but as its popularity and demand grew, it was further evolved and developed into a stand-alone product — built on the AutoCAD / AutoCAD Map 3D platform.

Civil 3D offers a familiar design environment and many AutoCAD-compatible shortcuts; and with true DWG (drawing) file support, Civil 3D allows you to store and share design data with existing AutoCAD users through the use of object enablers.

With Civil 3D projects, changes to drafting and annotation are automatically reflected throughout the model for quick and efficient visualizations that remain in sync as you make design changes at any stage of the process.

A popular use of Civil 3D is its fully integrated survey functionality, which offers a consistent environment for survey tasks and allows for raw imports of survey data, adjustments of least-squares, survey observation edits, and the automatic creation of survey figures and surfaces.

Civil 3D offers many other beneficial tools and features that can enhance your project such as, Corridor Modeling, Earthwork Calculations, Grading, Pipes Networks, Production Drafting, Geospatial Analysis, Point Clouds, and much more.

How is Civil 3D used?

Civil 3D is used by civil engineers and other professionals to create digital models of infrastructure projects. For example, the Florida Department of Transportation might use Civil 3D and the FDOT Civil 3D State Kit. to create a detailed digital model that lays out and details how they plan to reduce roadway congestion and accidents by widening roads and adding traffic signals.

In the case of a private consulting firm, Civil 3D may be used to develop a proposal for the design and construction of a roadway communicates their plan clearly to various stakeholders using intelligent 3D models, multiple layouts, view frames, plan and profile views, real-time information using the FDOT Civil 3D State Kit.

Ultimately, Civil 3D is used to explore, design, analyze, and optimize civil engineering projects. This, in turn, helps to improve infrastructure designs and build projects safely, **“On time”, and “On budget”**.

What's the status of Civil 3D and the FDOT?

Let's take a look at the progress of Civil 3D:

In **2008** the FDOT made a decision to support two CADD Platforms:

- Microstation / Geopack
- Civil 3D

In **2009** the central office in Tallahassee working with Autodesk started the development of the FDOT Civil 3D State Kit.

In **2012** the FDOT announced that Civil 3D projects completed using the FDOT Civil 3D State Kit would be accepted as one of the two CADD platforms for project deliverables.

In **2011** the first Civil 3D pilot project was started.

What's the status of training FDOT personal in the use of Civil 3D and the FDOT Civil 3D State Kit?

The process of training FDOT personal started in 2011 at the district level.

Currently offered classes:

**Introduction to AutoCAD
FDOT Methodology**

**Introduction to Civil 3D
FDOT Methodology**

**Civil 3D - Surveying
FDOT Methodology**

**Civil 3D GIS / Mapping
FDOT Methodology**

**Civil 3D R/W Mapping
FDOT Methodology**

**Civil 3D - Advanced Topics
FDOT Methodology**

**Civil 3D – Project Based Training
FDOT Methodology**

**InfraWorks 360
FDOT Methodology**

More to come...



What's the status FDOT Civil 3D State Kit?

The current release of the FDOT Civil 3D State Kit is based on Civil 3D 2016:

<http://www.dot.state.fl.us/ecso/downloads/software/FDOT2016CADDSoftware.shtm>



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FDOT2016 Civil 3D State Kit



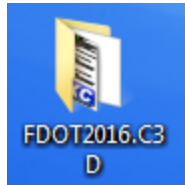
FDOT2016 Civil 3D State Kit (version 2016.00.01)
Contact: EC SO Support

Filename	Description	Size	Posted
Hot Fix Installation			
Installation Instructions	Instructions for installing the Hot Fix for the FDOT2016.C3D State Kit CADD Software.	290 KB	05/17/2016
Hot Fix Install	This Hot Fix includes only the files updated to address Roadway Design Bulletin 16-03. It should only be applied to workstations that have the FDOT2016.C3D State Kit installed.	932 KB	05/17/2016
FDOT2016 Civil 3D Installation			
Installation Instructions	Instructions for installing the FDOT2016 Civil 3D CADD Software.	1 MB	01/29/2016
FDOT2016C3D Install	This is the install file for the first release of the FDOT2016 Civil 3D State kit Software.	323 MB	01/29/2016
AutoCAD Only Installation			
FDOT2016 (AutoCAD Only) Install	This install is the same as the FDOT2016C3D Release; only scaled down to run on a standalone version of AutoCAD.	270 MB	02/01/2016
Note: Do NOT install this on a Autodesk Civil 3D machine as the registry locations are different.			



What's in the FDOT Civil 3D State Kit?

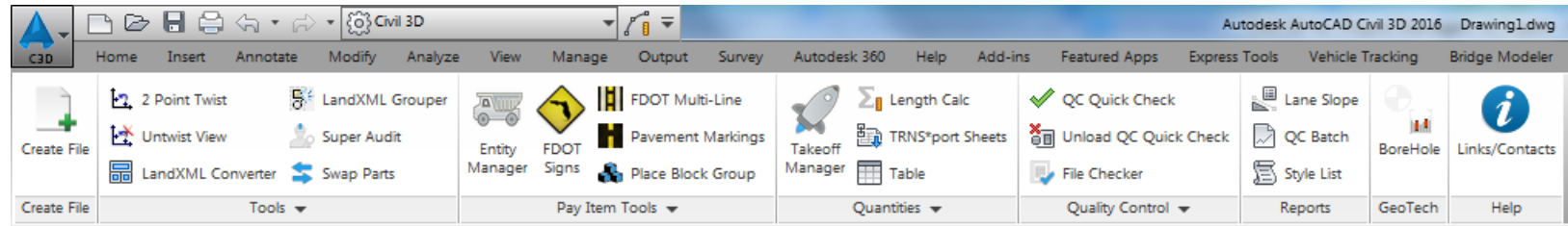
FDOT FDOT2016.C3D Desktop Folder:



Name	Date modified	Type	Size
_FDOT2016.C3D	3/11/2016 10:47 AM	Shortcut	3 KB
Create 3D Deliverables	3/11/2016 10:47 AM	Shortcut	1 KB
Create Project	3/11/2016 10:47 AM	Shortcut	1 KB
ECSO GoToMeeting	3/11/2016 10:47 AM	Internet Shortcut	1 KB
ECSO Website	3/11/2016 10:47 AM	Internet Shortcut	1 KB
FDOT Civil 3D Quick Clips	3/11/2016 10:47 AM	Internet Shortcut	1 KB
FDOT XML Signing	3/11/2016 10:47 AM	Shortcut	1 KB
File Checker	3/11/2016 10:47 AM	Shortcut	1 KB
Land XML Conveter	3/11/2016 10:47 AM	Shortcut	1 KB
Land XML Grouper	5/4/2016 2:49 PM	Shortcut	1 KB
Land XML Visualizer	5/4/2016 2:49 PM	Shortcut	1 KB
PEDDS Client	3/11/2016 10:47 AM	Shortcut	1 KB
Sheet Set Organizer	3/11/2016 10:47 AM	Shortcut	1 KB
Submit a Support Request	3/11/2016 10:47 AM	Internet Shortcut	1 KB

What's in the FDOT Civil 3D State Kit?

FDOT Ribbon:

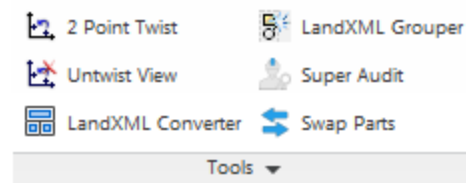


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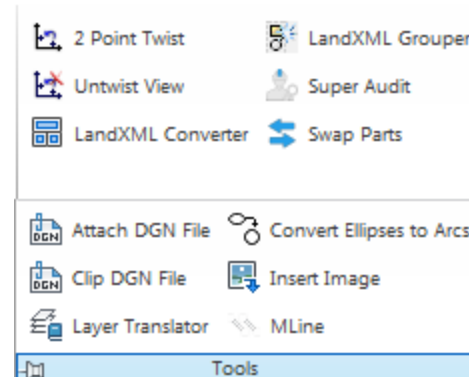


Create File

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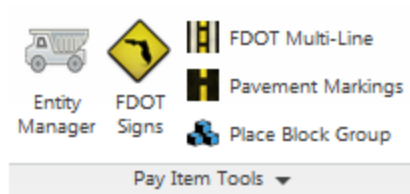


Expanded Tools panel

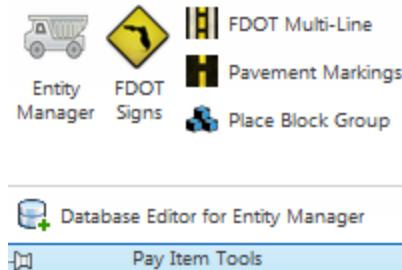


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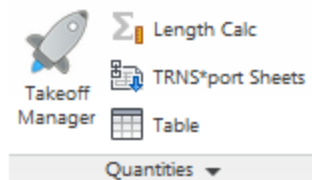
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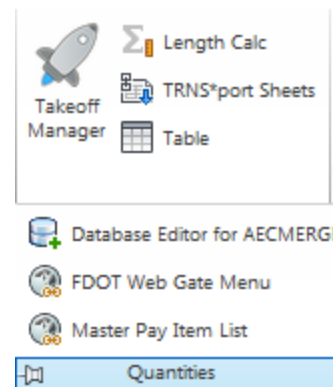
Expanded Pay Item Tools panel



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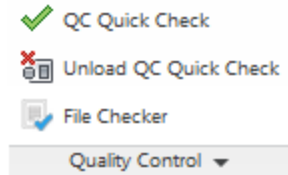


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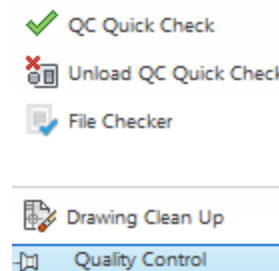


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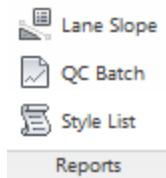
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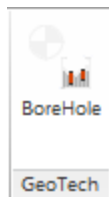
Expanded Quality Control panel



Reports panel:

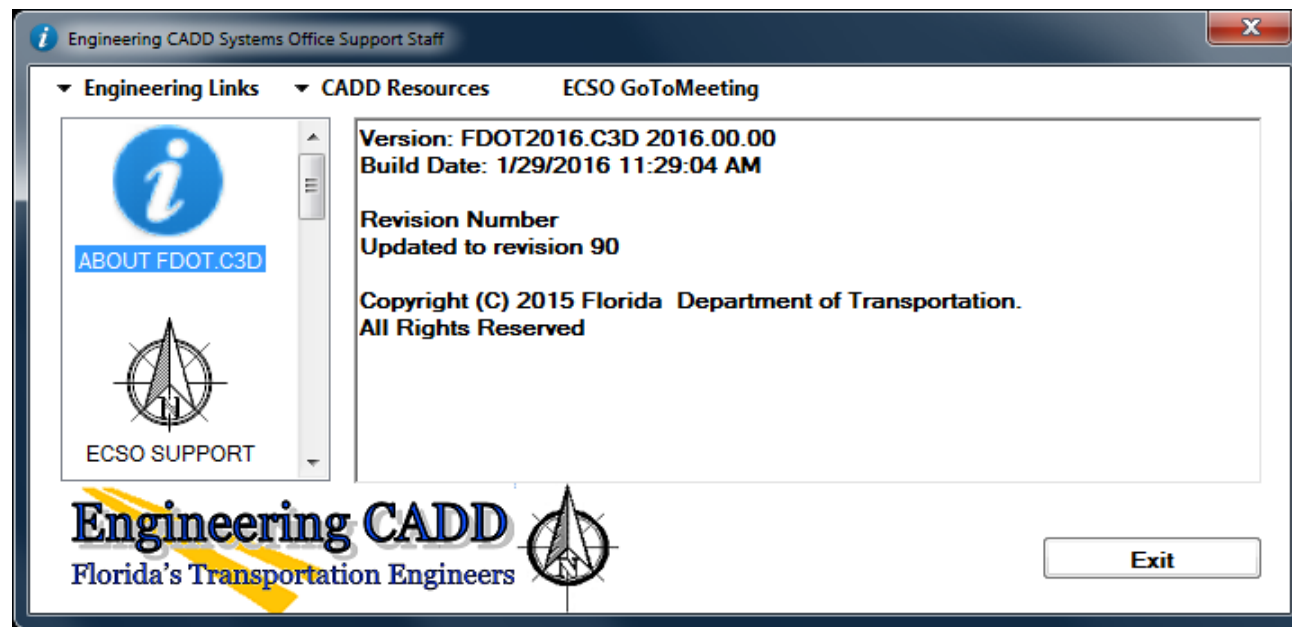
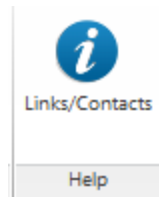


GeoTech panel:



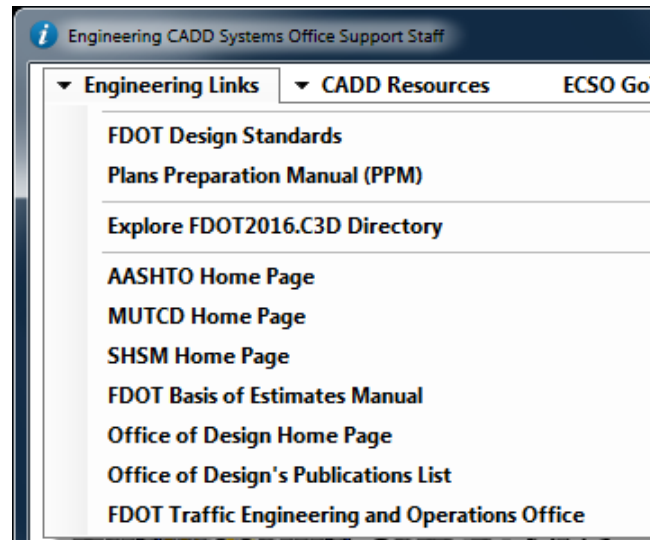
What's in the FDOT Civil 3D State Kit?

Help panel:

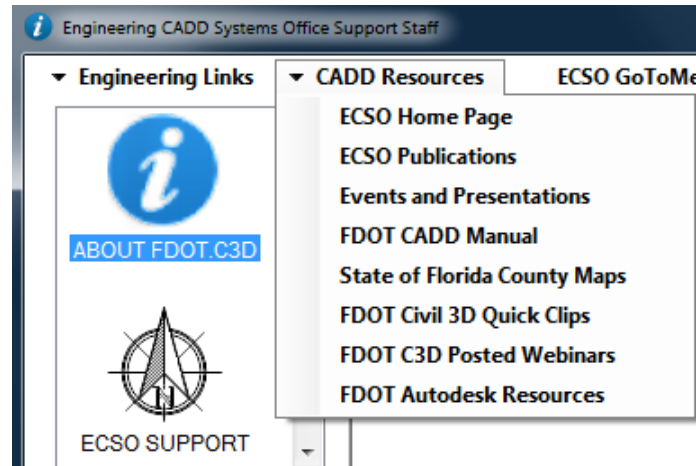


What's in the FDOT Civil 3D State Kit?

Engineering Links:



CADD Resources:



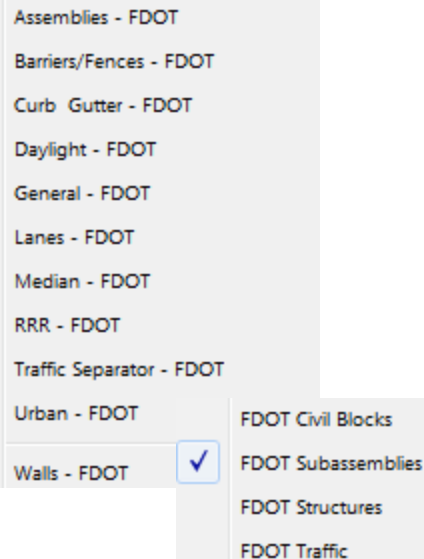
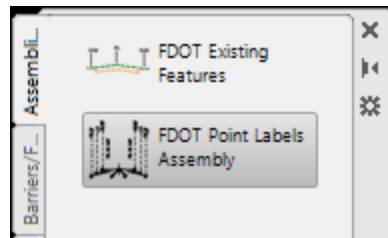
What's in the FDOT Civil 3D State Kit?

FDOT Tool Palette:

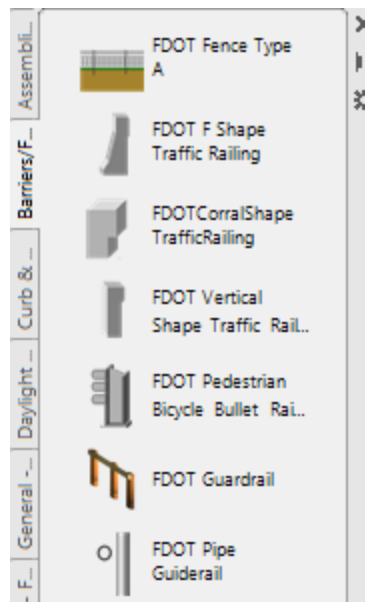
Subassemblies Tabs:



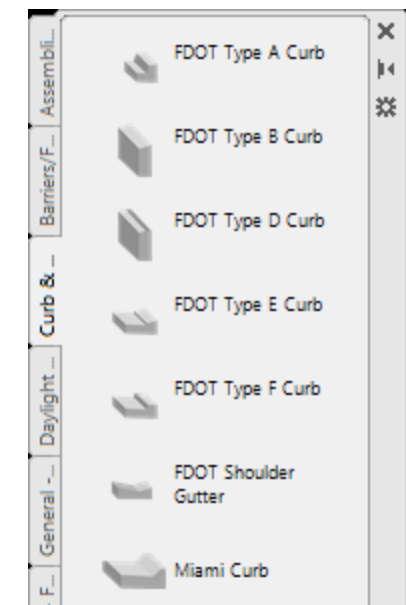
Assemblies



Barriers & Fences

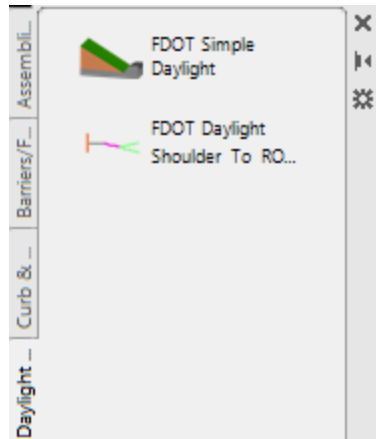


Curbs & Gutters

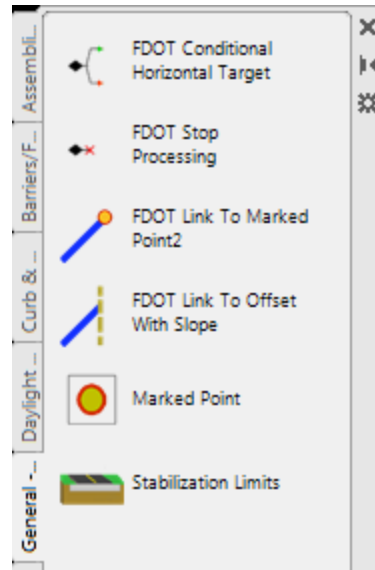


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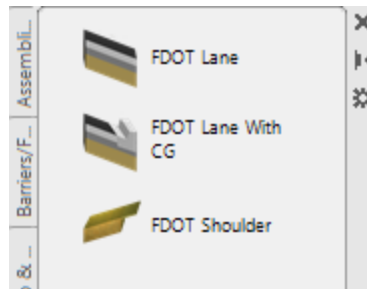
Daylight



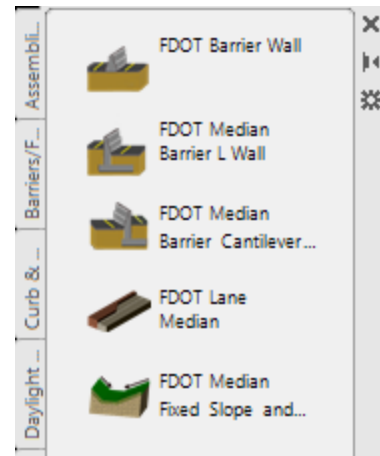
General



Lanes

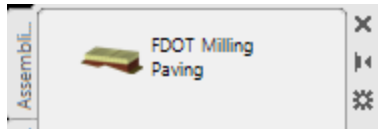


Medians

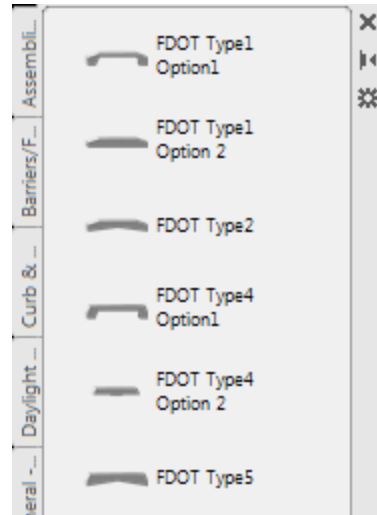


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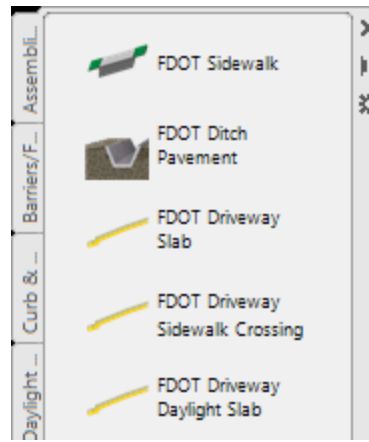
RRR



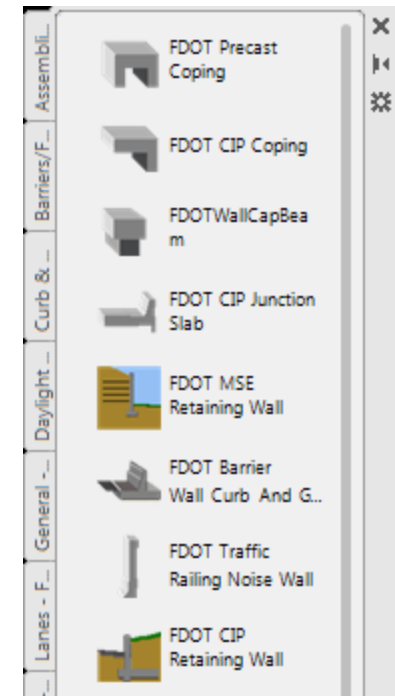
Traffic Separator



Urban

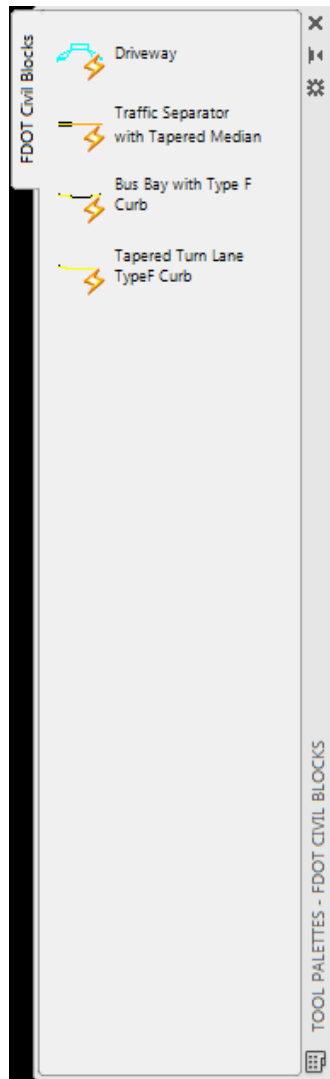


Walls

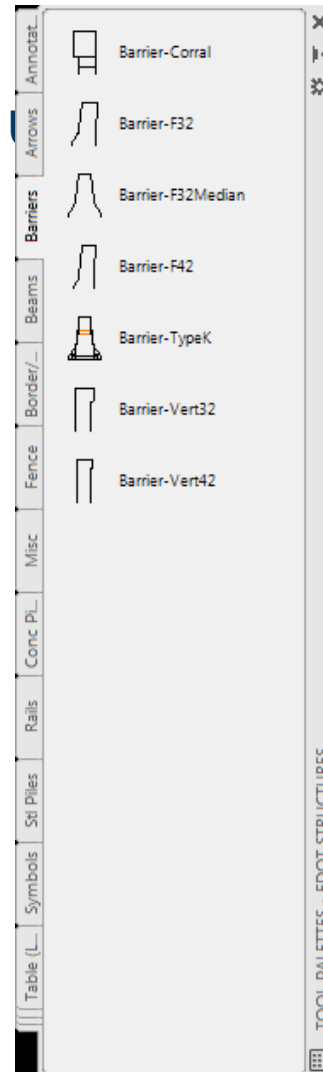
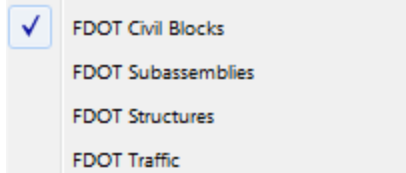


What's in the FDOT Civil 3D State Kit?

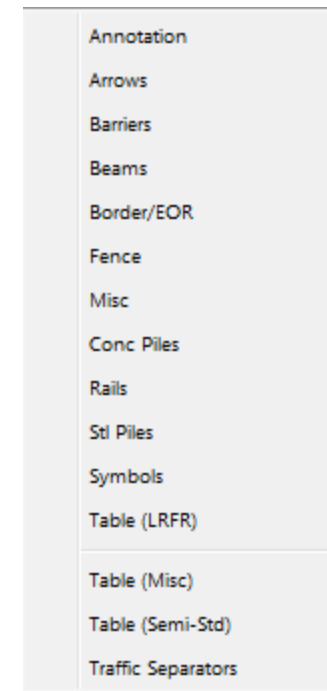
FDOT Civil Blocks



Traffic Separator

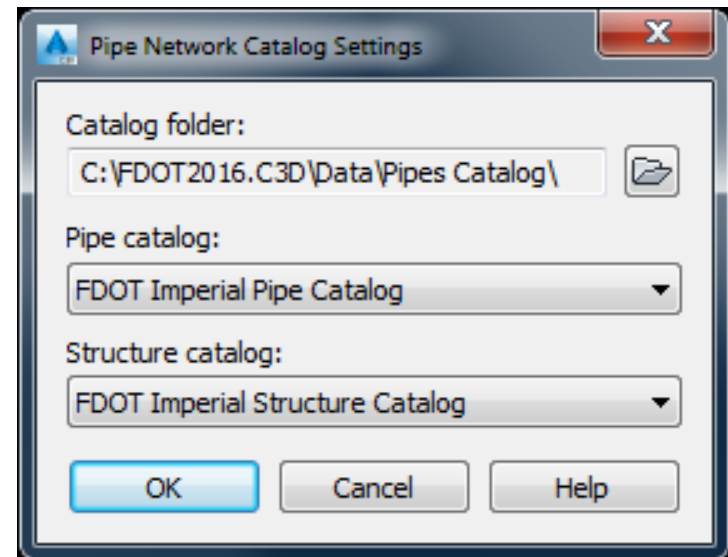
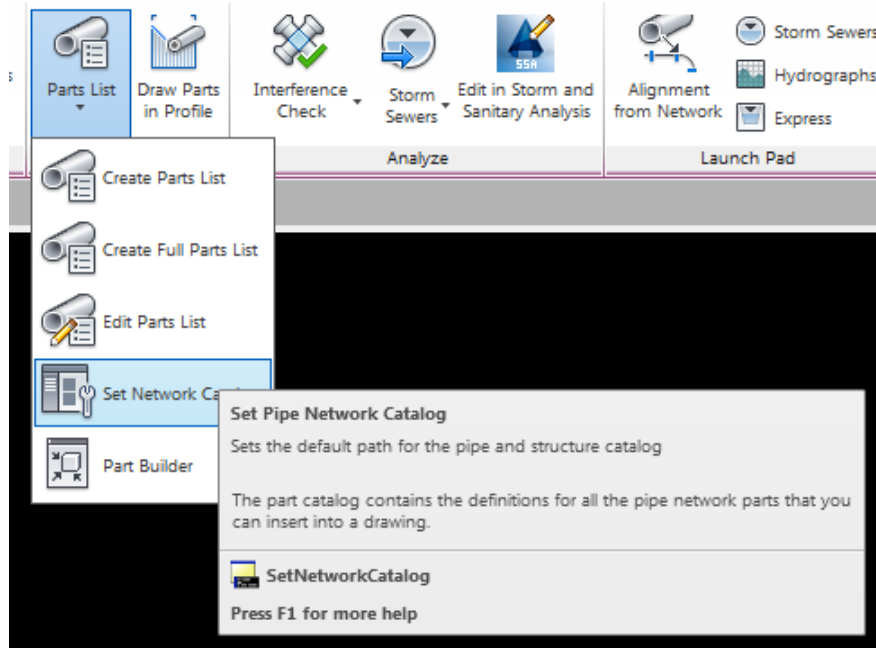


Walls



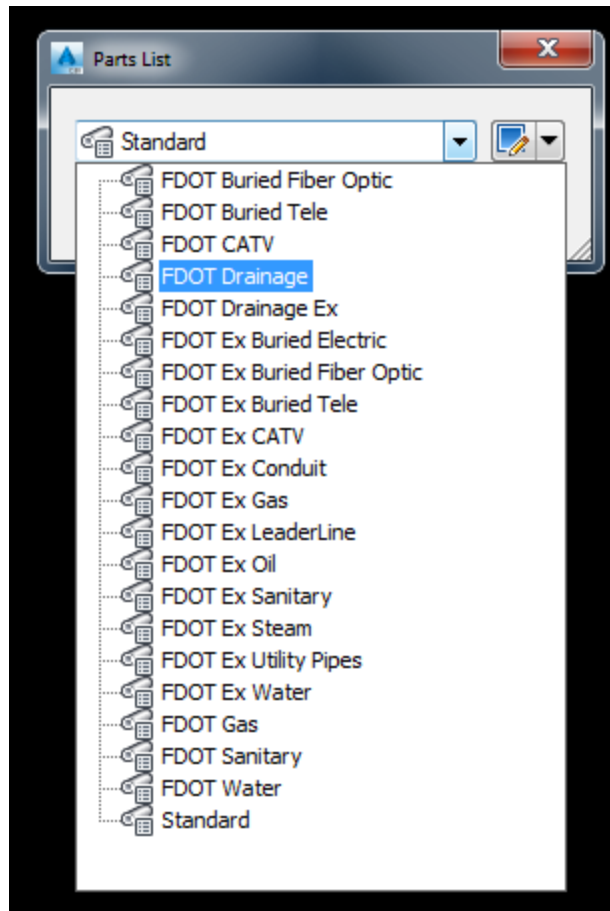
What's in the FDOT Civil 3D State Kit?

Pipe Network Catalogs



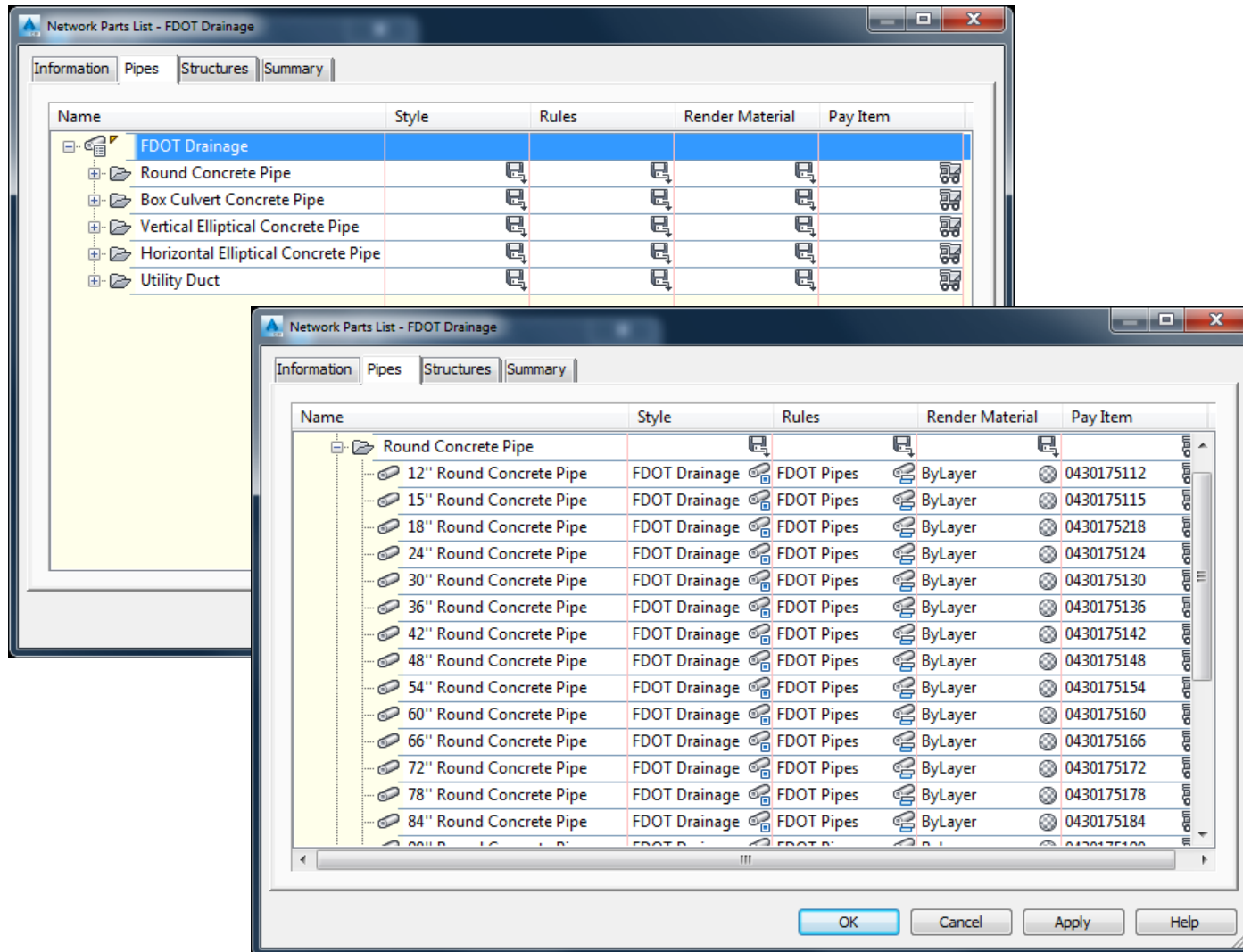
What's in the FDOT Civil 3D State Kit?

Parts List



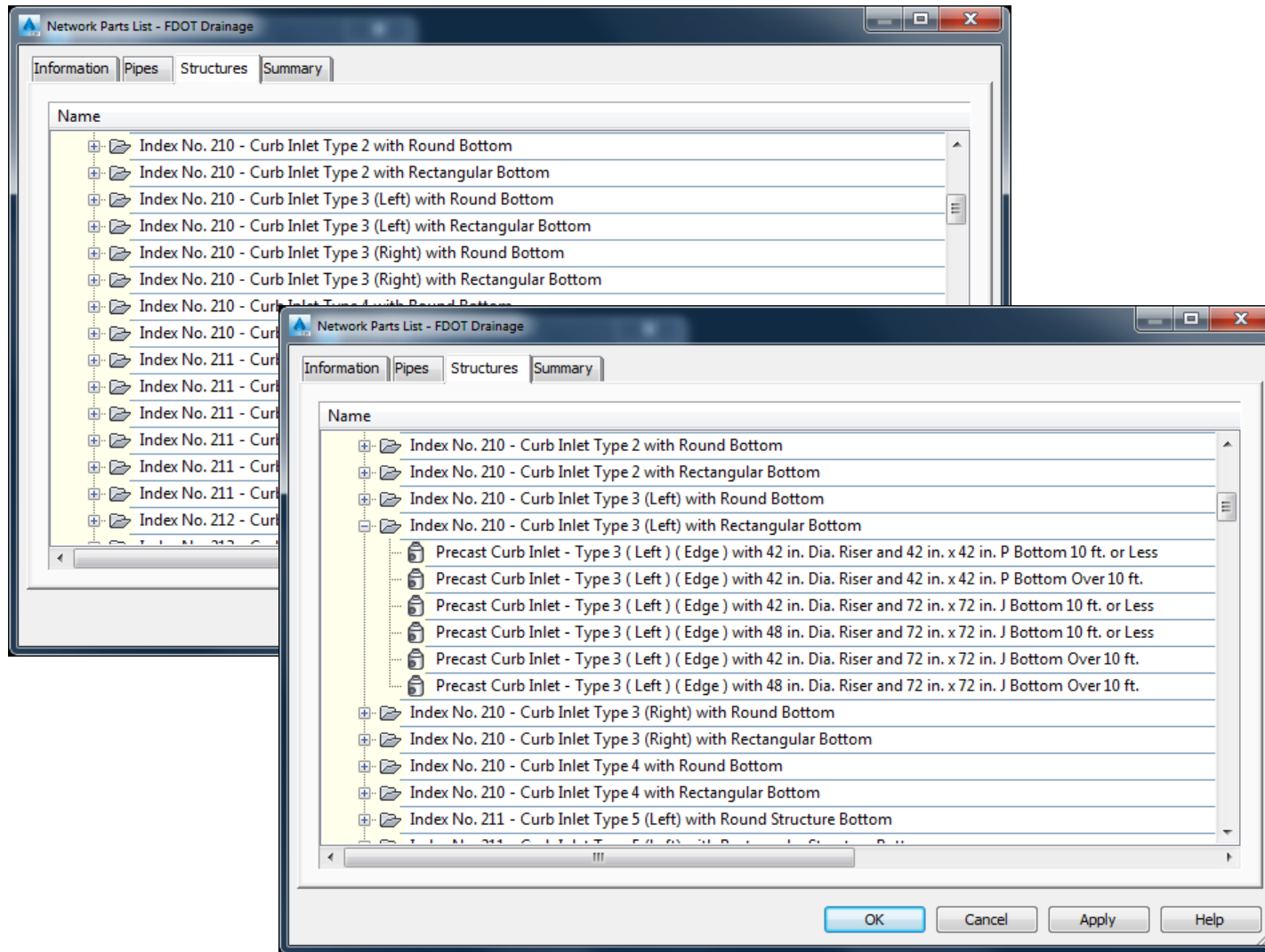
What's in the FDOT Civil 3D State Kit?

Pipes



What's in the FDOT Civil 3D State Kit?

Structures



Why use Civil 3D on a FDOT project?

What's the goal on any FDOT project?

Deliver projects “On Time” and “On Budget”

How can Civil 3D help the FDOT meet this goal?



IMPROVE PROJECT DELIVERY

Enhance project quality and accuracy and optimize design.



MAINTAIN MORE CONSISTENT DATA

Automate project deliverables and reduce documentation errors.



RESPOND FASTER TO PROJECT CHANGES

Accelerate detailed design and help streamline time-consuming tasks.

BIM tools for civil engineering design:

Civil 3D's Civil engineering software tools support **Building Information Modeling (BIM)** and help reduce the time it takes to design, analyze, and implement changes.

Efficient Civil Design:

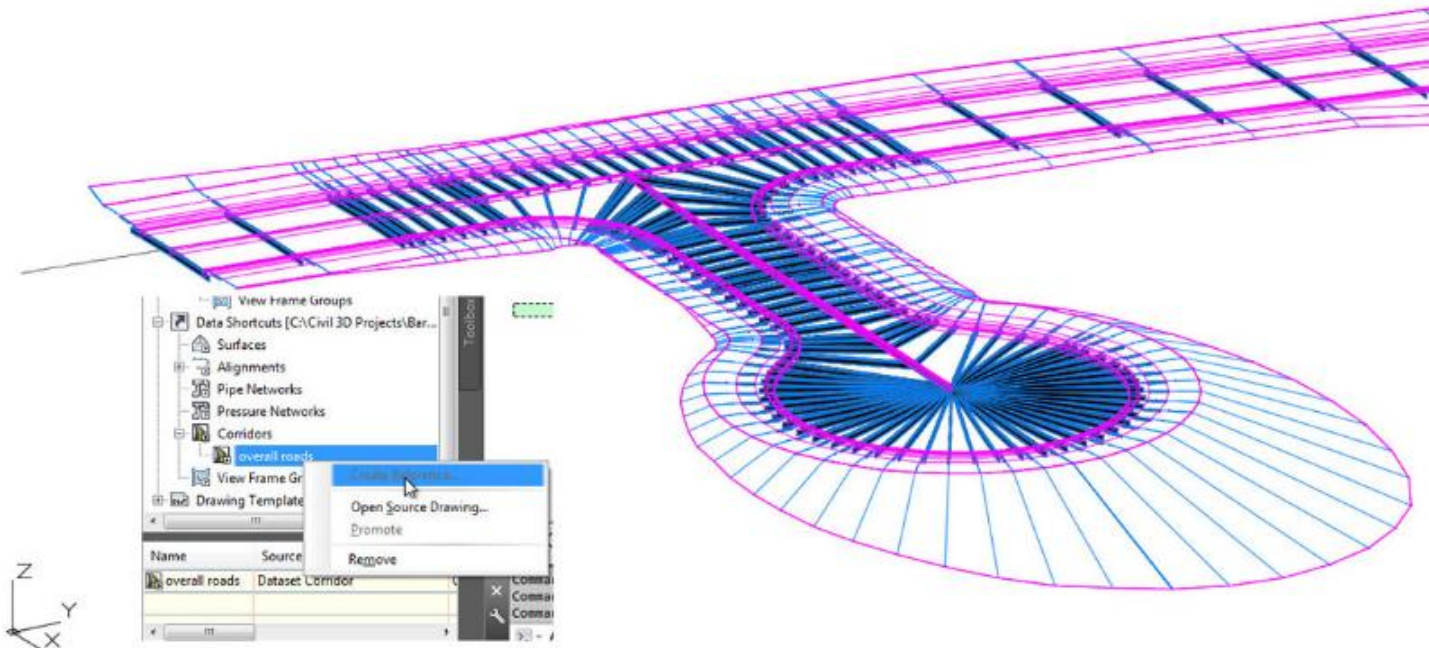
With Civil 3D you can perform faster design iterations with an intelligent, 3D model-based application that dynamically updates related civil design elements when changes are made.

Streamline time-consuming tasks for corridor design, which includes intersection, roundabouts, and gravity network design.

Corridor data shortcut (DREF) (enhanced):

Create data shortcuts for corridors so other drawings can reference them. When data shortcuts are created for a corridor, shortcuts are also created for the alignments and profiles that make up the corridor baselines. Save the geometry of a reference surface in the drawing that contains the data shortcut reference, and create multiple data shortcut references at once

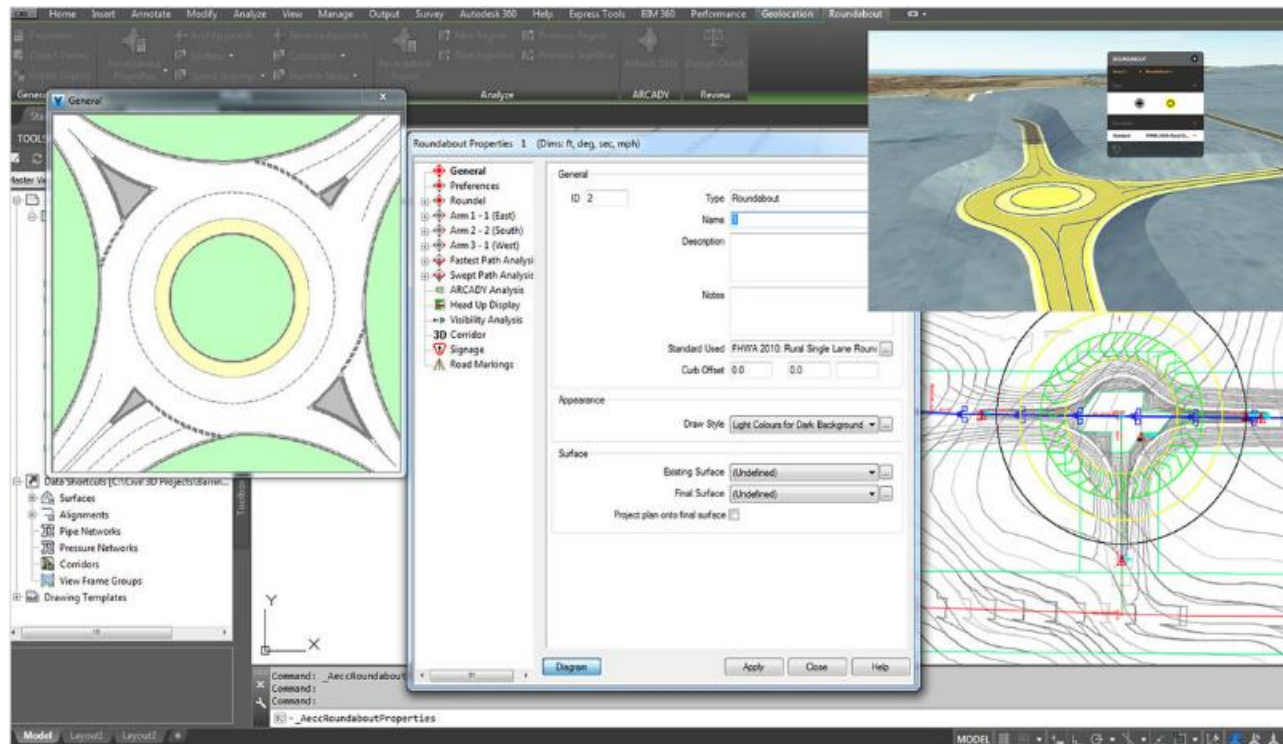
New in 2017



Advanced roundabout design:

AutoCAD Civil 3D now offers integrated roundabout-related features from **Vehicle Tracking swept path analysis software**, so you can create a new type of roundabout object. In addition, you can now bring InfraWorks 360 roundabout designs into Civil 3D drawings.

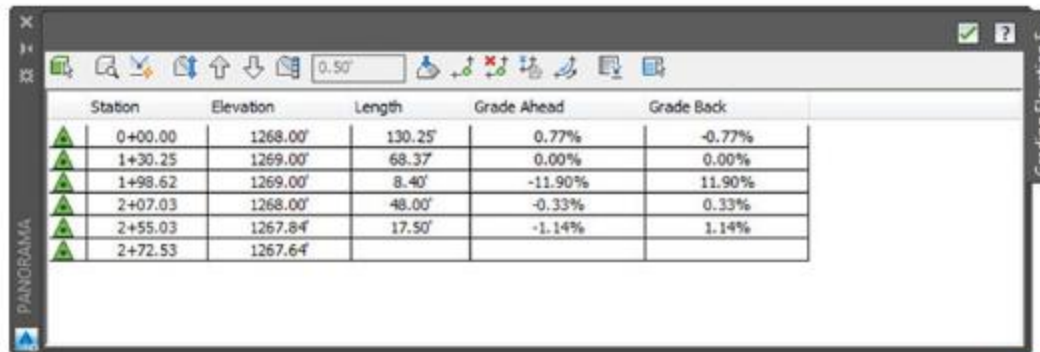
New in 2017



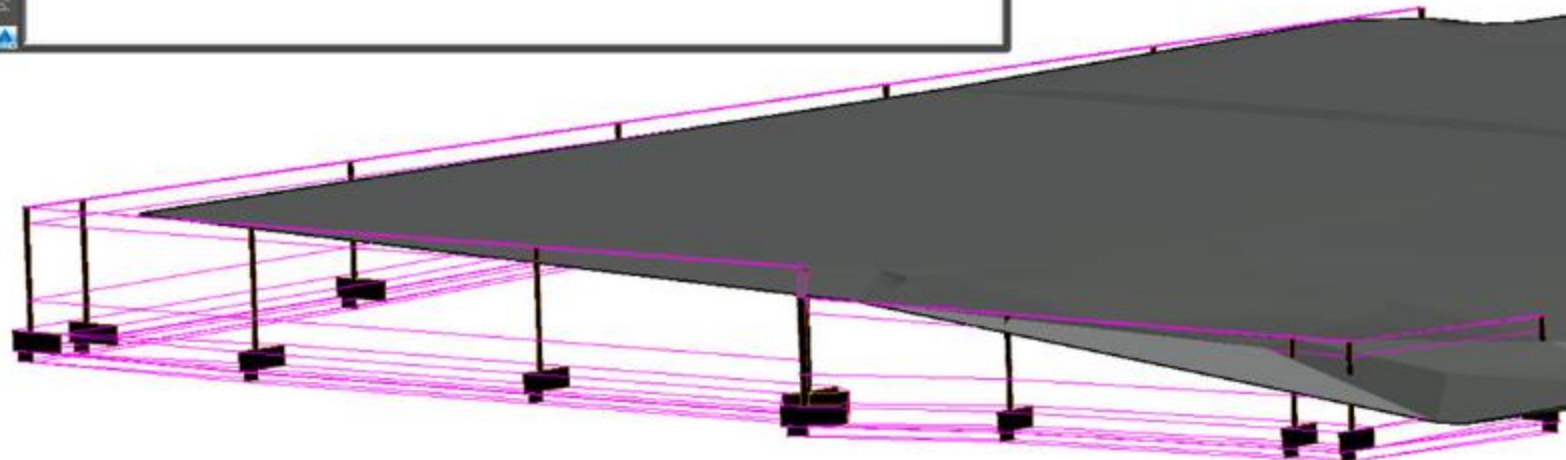
Feature line as corridor baseline:

In addition to alignments and profiles, you can now use feature lines as corridor baselines. You can also select feature lines when creating the corridor and when adding baselines.

New in 2017



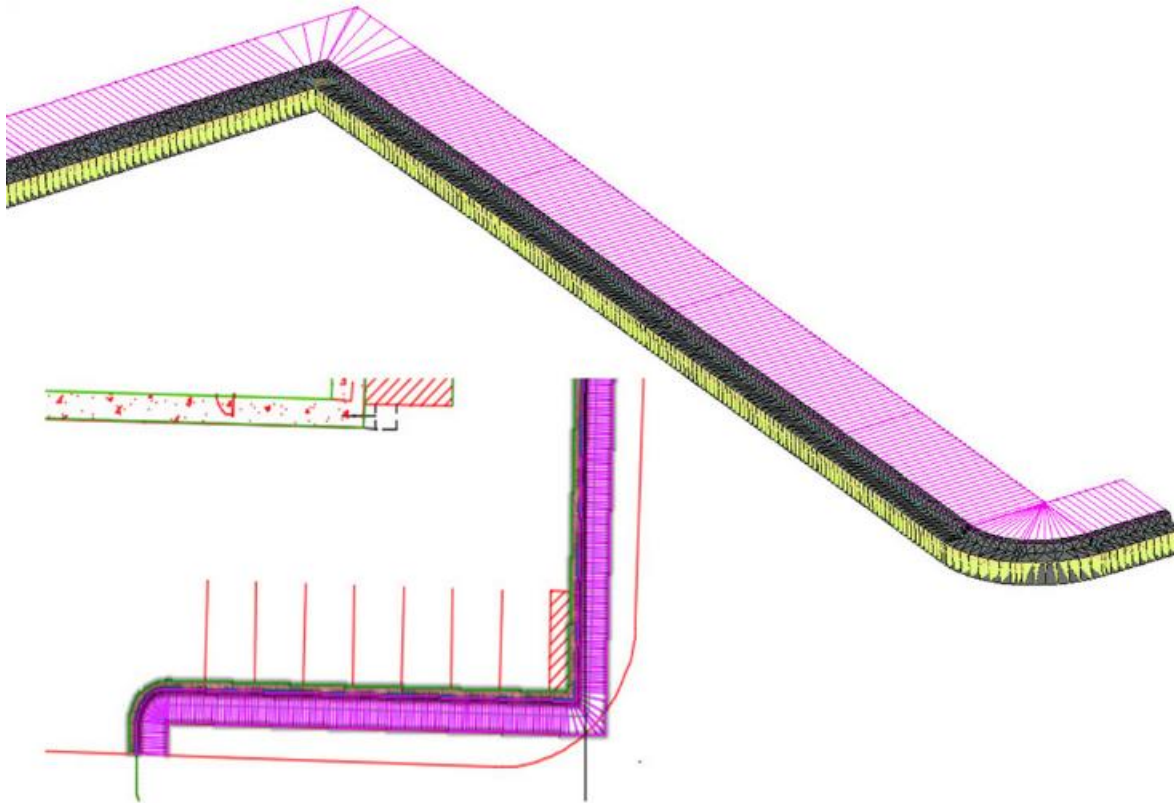
Station	Elevation	Length	Grade Ahead	Grade Back
0+00.00	1268.00'	130.25'	0.77%	-0.77%
1+30.25	1269.00'	68.37'	0.00%	0.00%
1+98.62	1269.00'	8.40'	-11.90%	11.90%
2+07.03	1268.00'	48.00'	-0.33%	0.33%
2+55.03	1267.84'	17.50'	-1.14%	1.14%
2+72.53	1267.64'			



Corner cleanup for corridors:

Where corridor tangents intersect at a corner, and where the corridor is created at a fixed width, the inner and outer corners of corridors are cleaned up automatically to improve modeling efficiency and accuracy.

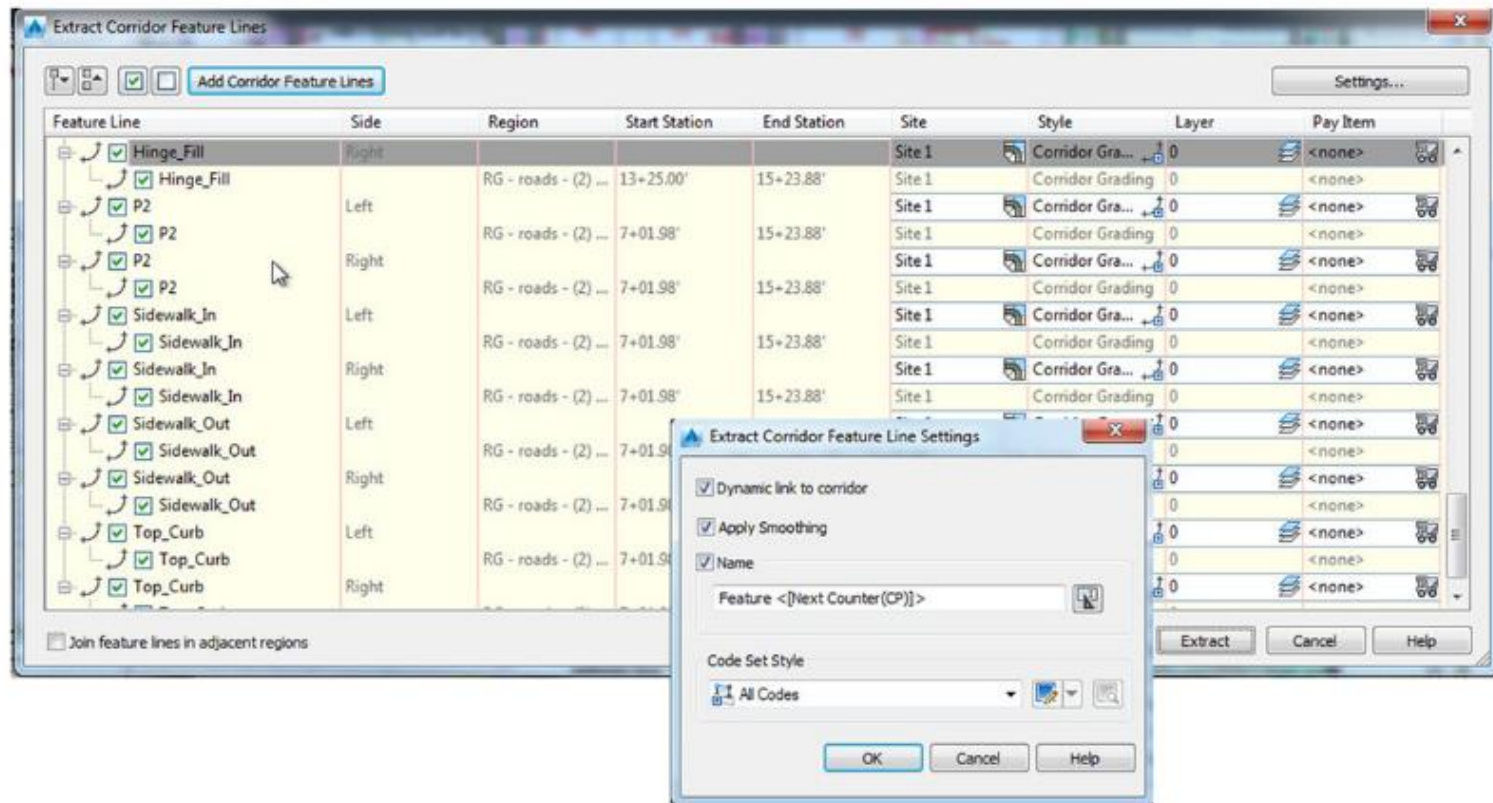
New in 2017



Extract corridor feature line workflow:

You can now extract multiple feature lines from within corridor regions or closed polygonal areas. Use name template options to add corridor-related properties to the feature line names.

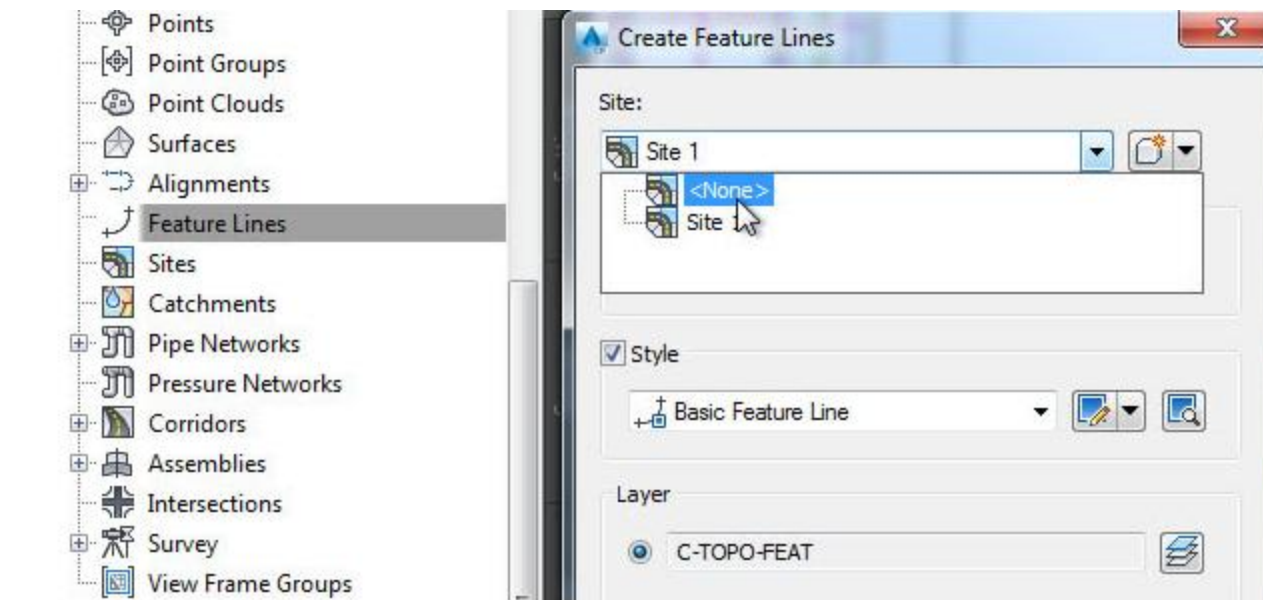
New in 2017



"No Site" option for feature lines:

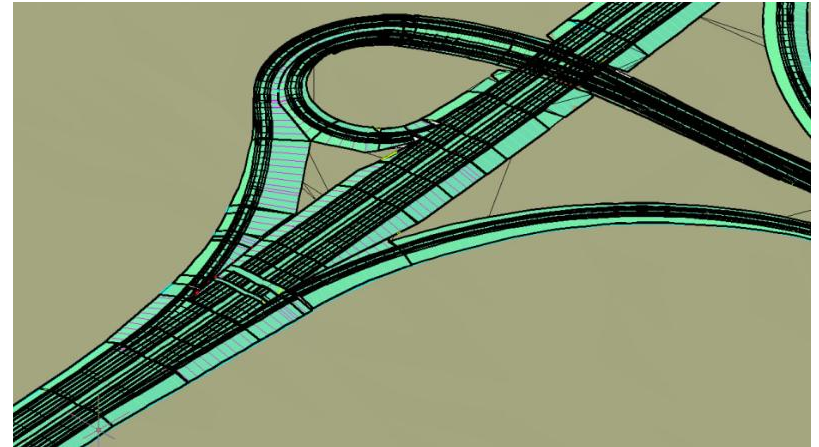
Feature lines created outside of a site do not interact with each other, so you do not need to specify the style priority for them as you do for feature lines that exist in the same site. These "No Site" lines do not interact with other objects that they cross, such as alignments, parcels, or survey figures.

New in 2017



Corridor design tools:

Use corridor modeling functionality to create intelligent models for road and highway design and other transportation systems. Create proposed surfaces, earthwork volumes, material totals, and drafted cross sections. Select linear corridor targets from **AutoCAD** Xrefs. Extract solids from corridor shapes. Directly use alignments, profiles, survey figures, feature lines, and AutoCAD polylines to define corridor transitions and elevation constraints.

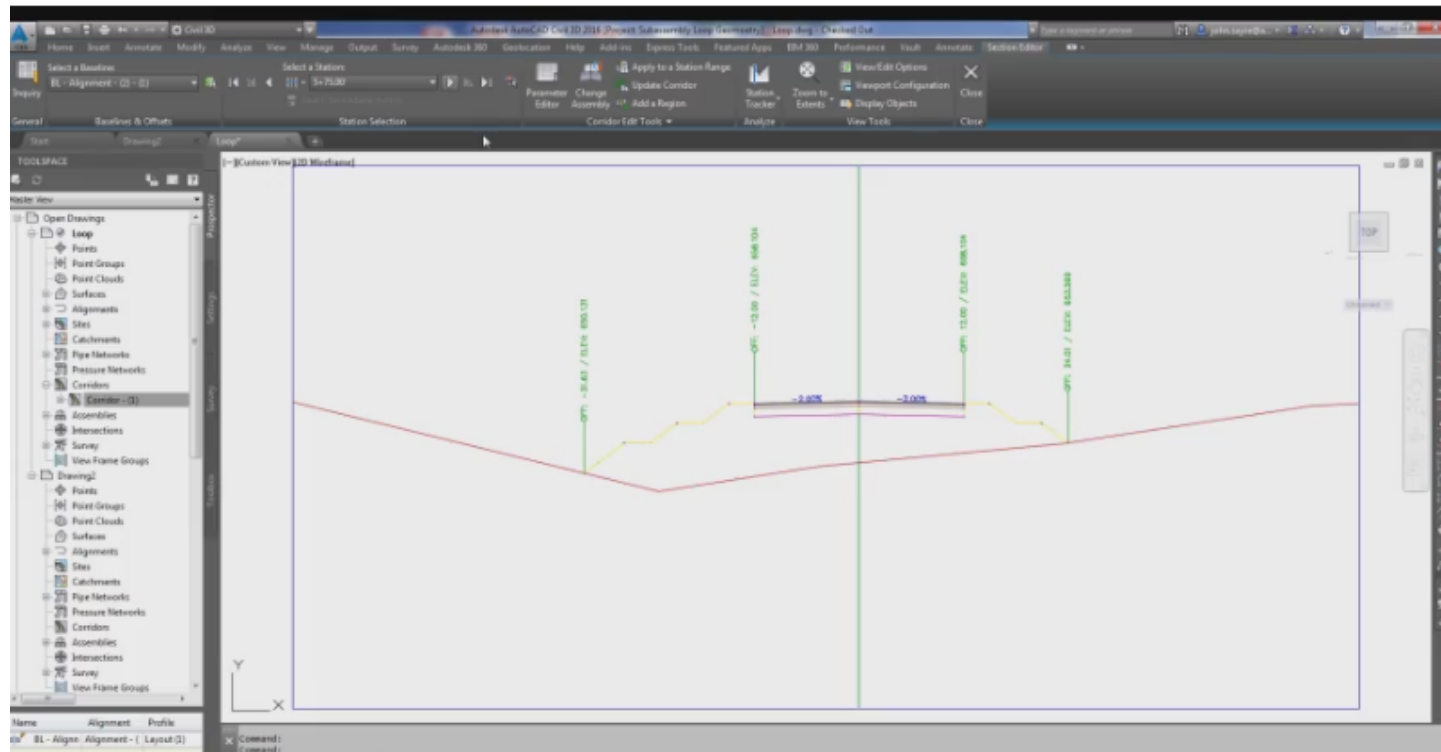


The interactive intersection builder enables you to create complex models through intersecting roads that remain dynamic as your designs change. Build intelligent custom components using Subassembly Composer.

- Use the Loop Geometry tool for repeating specified links until they reach a surface target within the Subassembly Composer, or until they repeat a specified number of times.
- Specify corridor targets by layer. Apply corridor targeting using entities grouped in an AutoCAD layer, and select alignments by layer to use as width and offset targets.
- Create AutoCAD solids from Civil 3D TIN surfaces, pipe networks to use for visual analysis in other applications.

Loop Geometry tool:

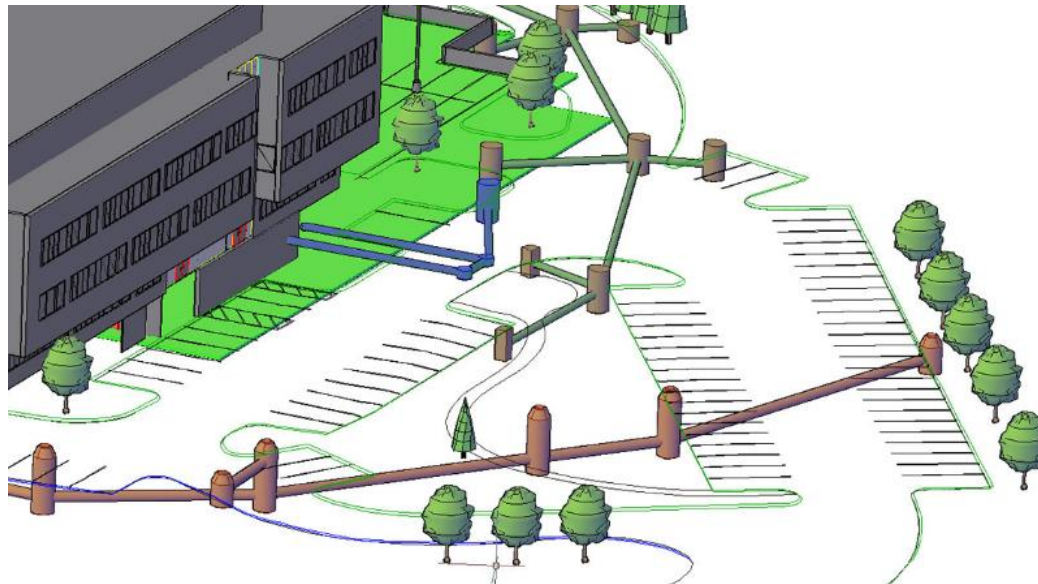
Use the Loop Geometry tool to repeat specified links until they reach a surface target within the Subassembly Composer, or until they repeat a specified number of times.



Gravity pipe networks:

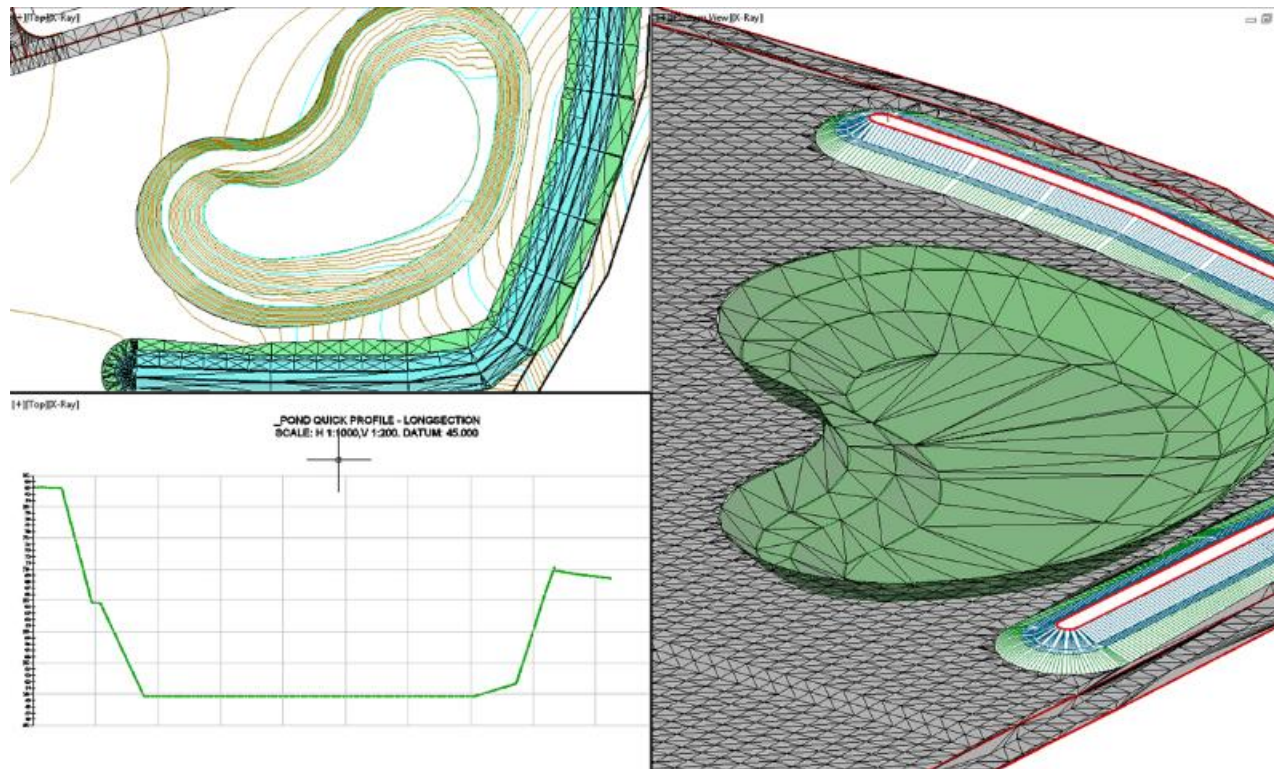
Use rules-based tools to lay out storm drainage systems. Make changes to pipes and structures using graphical or numerical input, and conduct interference checks.

- Plot and complete final drafting of the pipe network in plan, profile, and section views.
- Share pipe network information with Storm and Sanitary Analysis software.
- Create AutoCAD solids from Civil 3D TIN surfaces, pipe networks for visual display.



Grading:

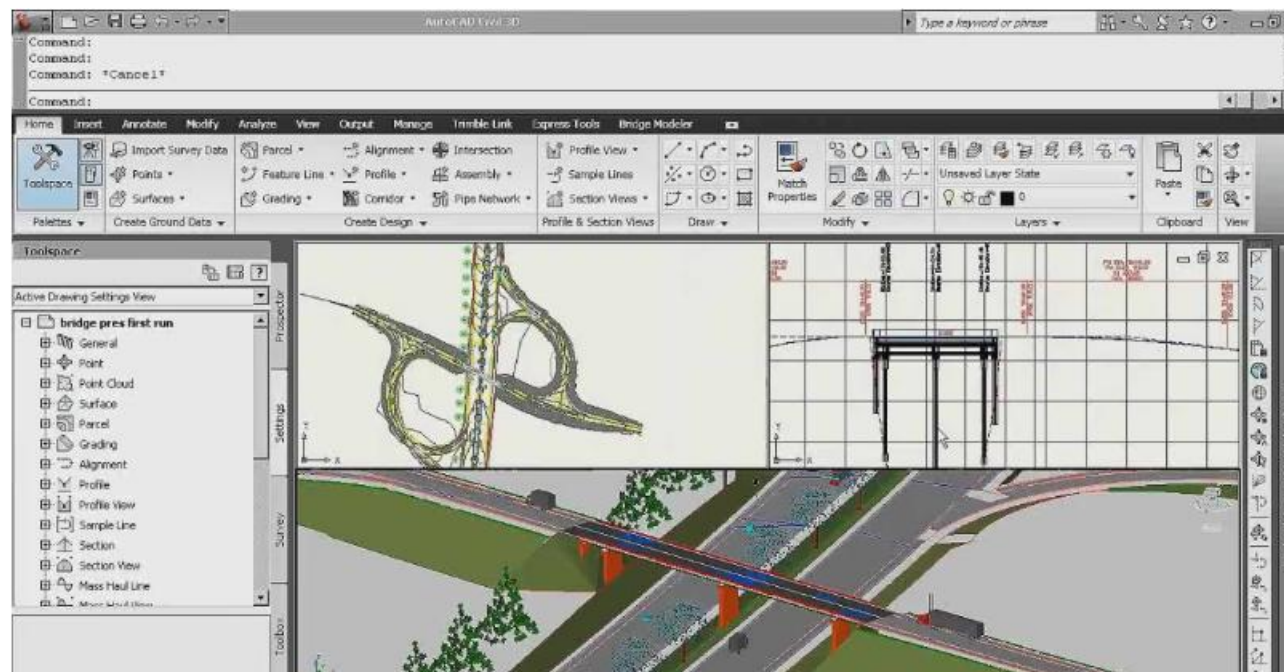
Terrain models maintain dynamic relationships with related elements such as breaklines, corridor models, and grading objects. Surfaces serve as references to create profiles, sections, and corridors. Save time and minimize errors with automatic updating. Powerful daylighting and grade-projection tools can generate surface models for several types of grading projections. Develop surfaces with easy-to-use graphical and tabular grading manipulation tools.



Bridge modeling:

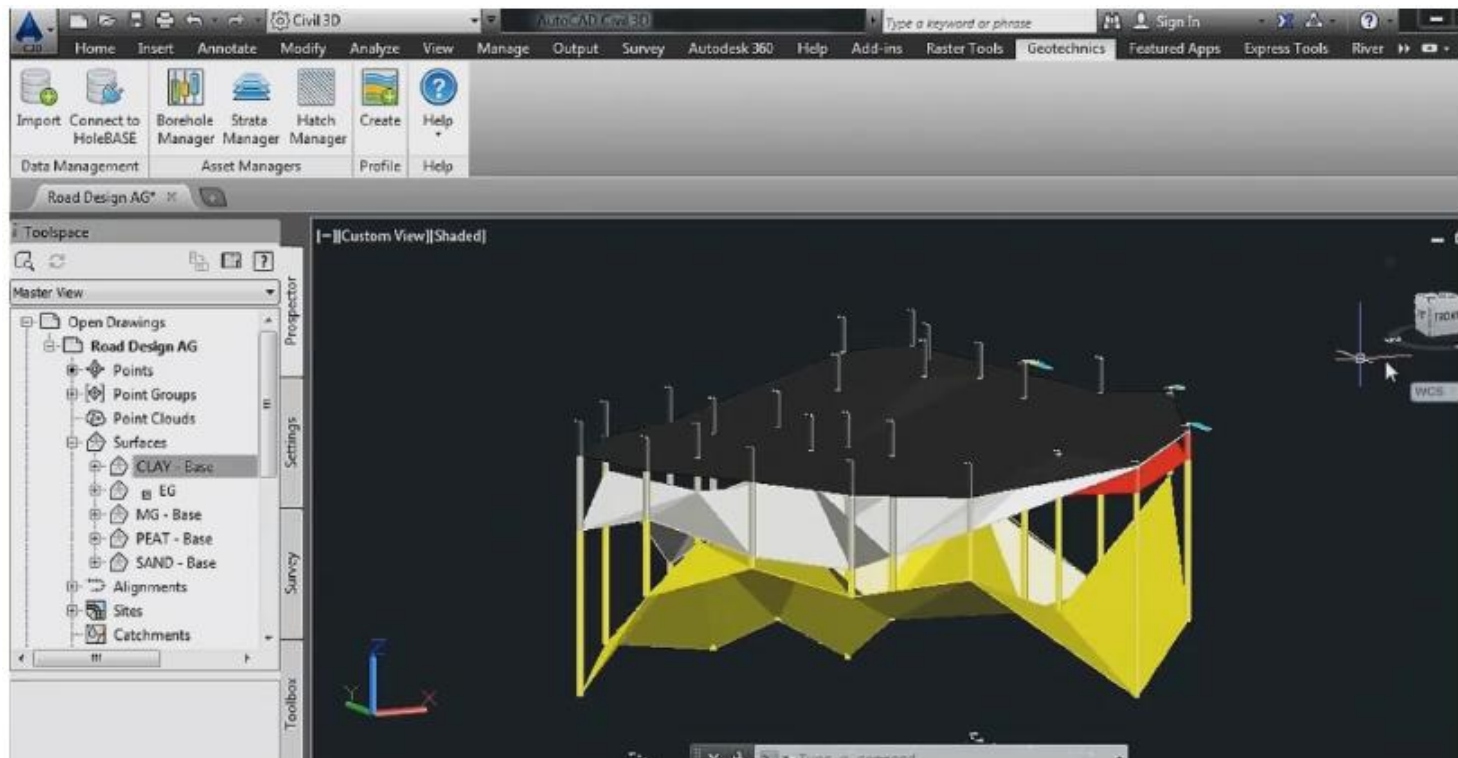
The Bridge Module* enables modeling of bridges and bridge components. Model bridges for placement based on roadway geometry and surfaces, including bridge deck, piers, abutments, bearings, and barriers. Extract strings, such as girders and barriers, to create Civil 3D profiles.

*Included with AutoCAD Civil 3D 2017 as well as Infrastructure Design Suite 2017 Premium and Ultimate editions on a subscription plan.



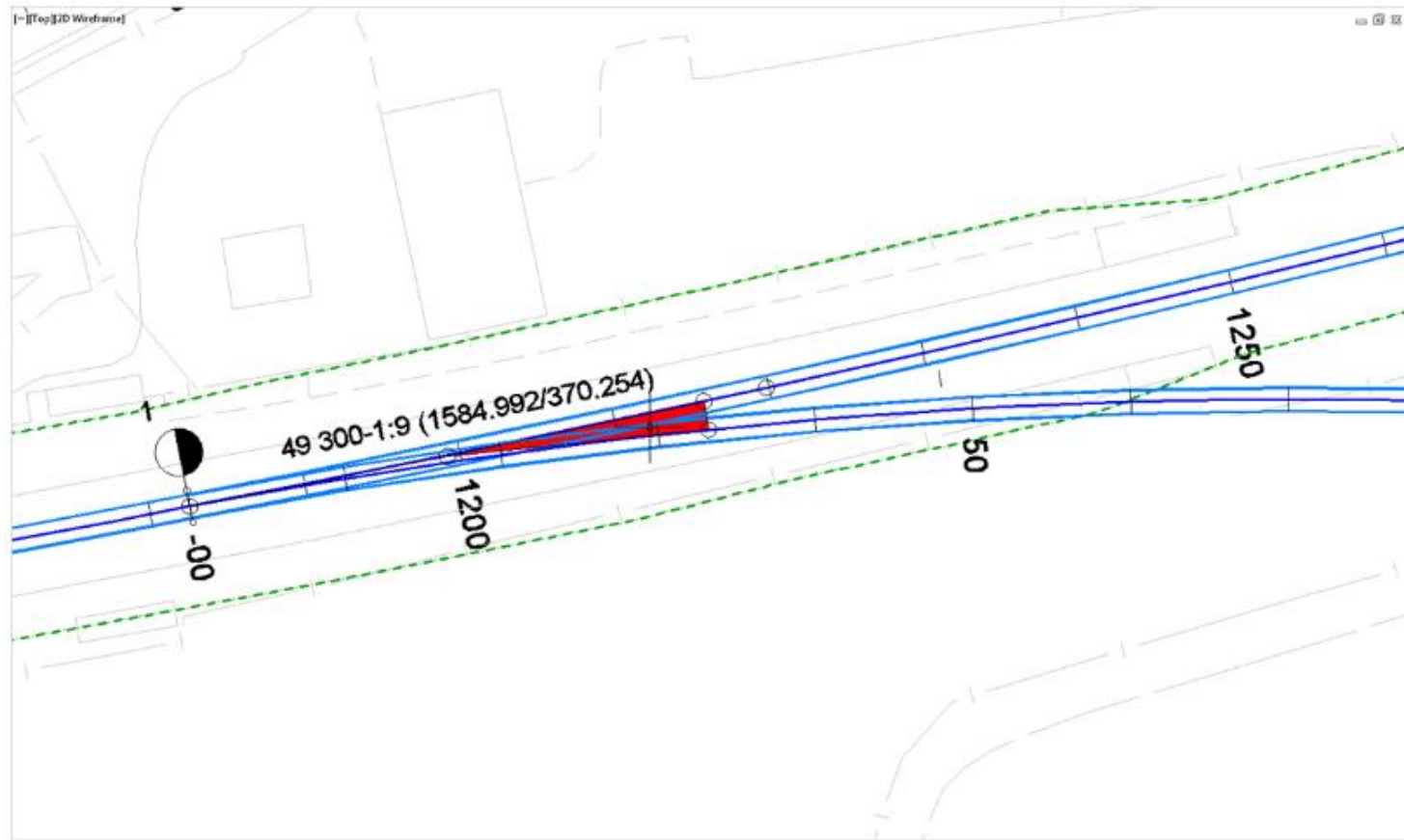
Geotechnical modeling:

The Geotechnical Module helps streamline import and use of borehole data. Import boreholes into AutoCAD Civil 3D. Create surfaces from borehole strata. Document borehole strips.



Rail track layout:

The Rail Layout Module helps to streamline layout of rail tracks. Create new alignments and switch graphics based on rail turnout catalog.



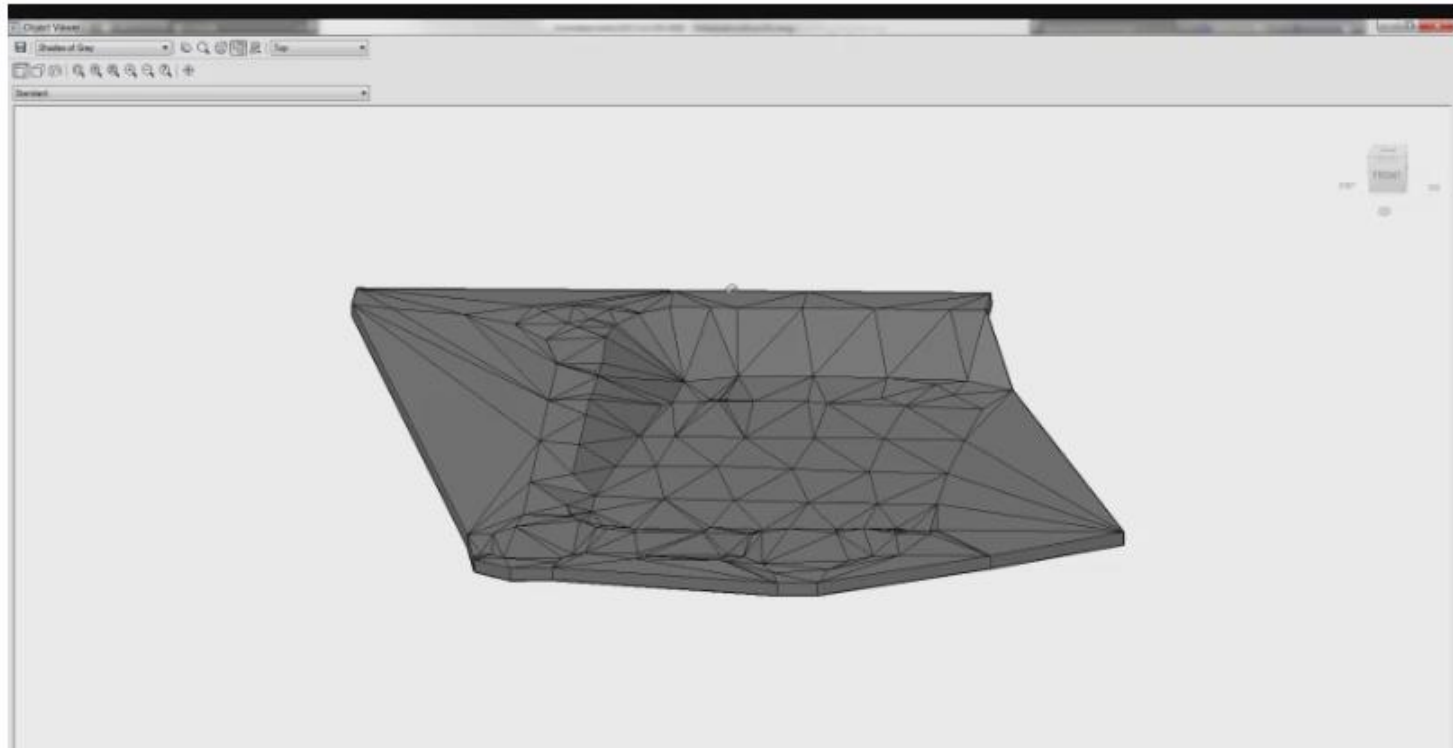
Design concepts with InfraWorks 360:

Accelerate the civil design process using workflows that take advantage of interoperability with **InfraWorks 360**. Develop plans and estimates at the appropriate level of detail to help confirm scope, budget, and schedule. Better predict how project alternatives will perform within the context of the existing environment, and communicate more effectively to stakeholders.



Solids from Civil 3D objects:

Create AutoCAD solids from AutoCAD Civil 3D TIN surfaces, pipe networks to use for visual analysis in other applications.



Features

Improve your civil drafting and documentation process

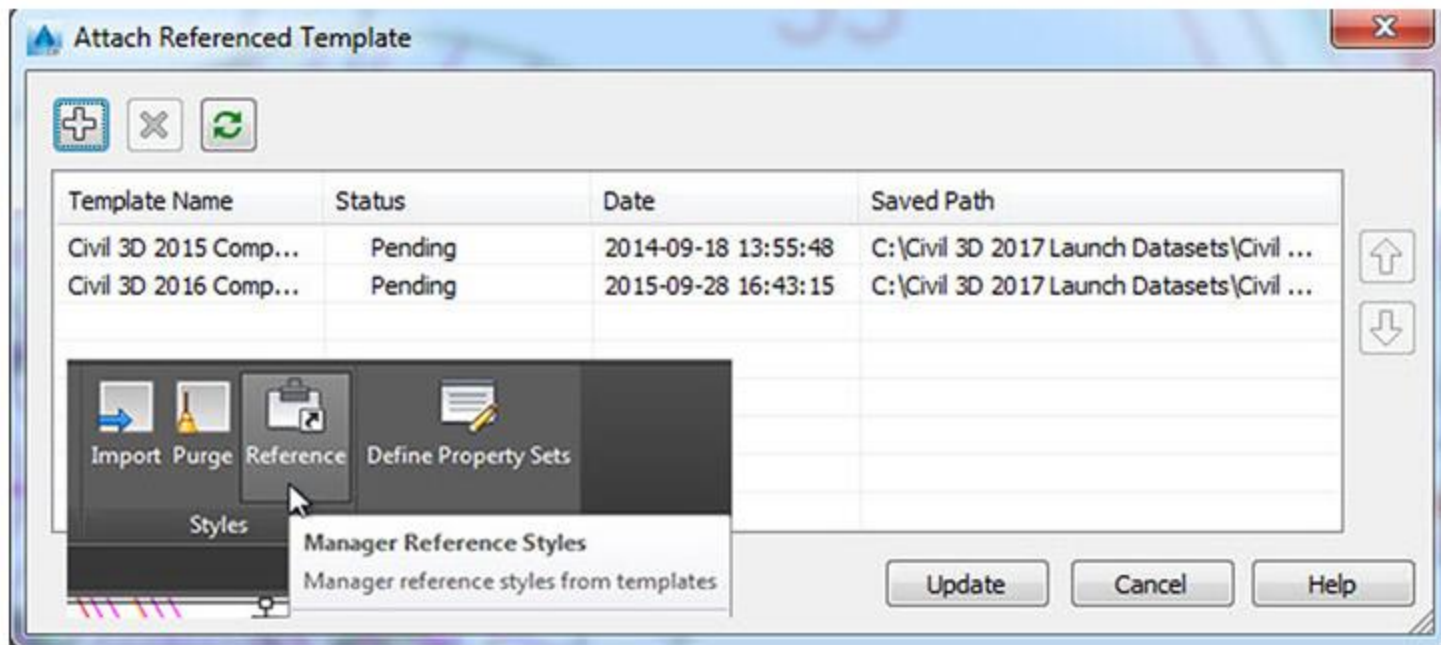
Improve civil drafting and documentation with Civil 3D by connecting design and documentation tasks, which helps you boost productivity and deliver higher-quality designs and construction documentation.

Changes to design elements are captured in documentation, minimizing manual updates.

Reference styles utility:

You can now synchronize styles in a drawing with styles in external reference templates. Reference templates simplify the management of drawing styles and keep them up to date.

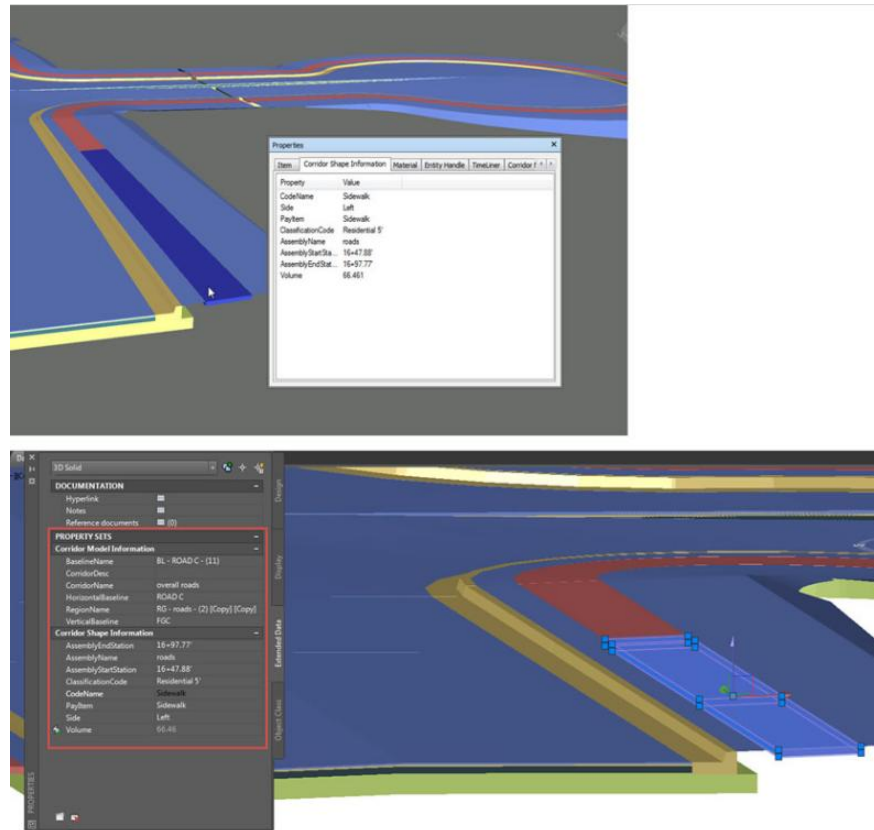
New in 2017



Property data to corridor solids:

New in 2017

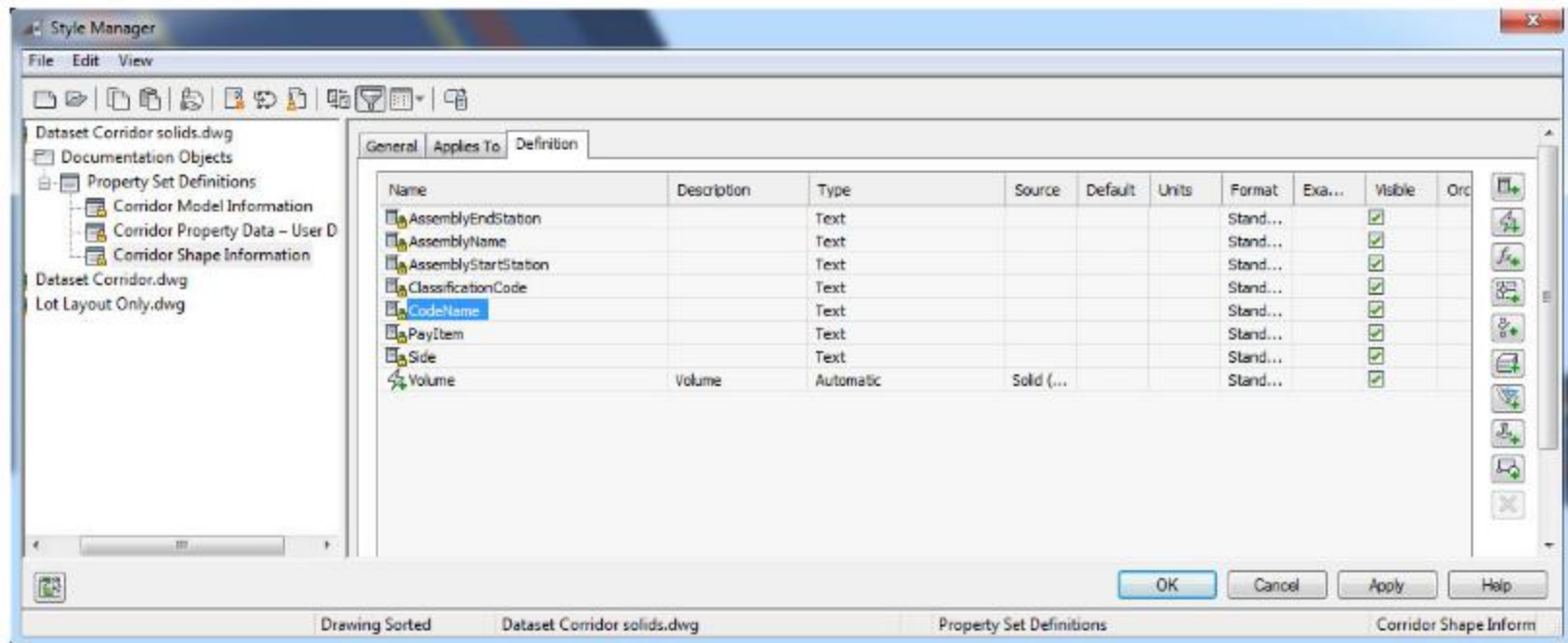
Enhancements to corridor solid extraction enable the automatic association of property data and the ability to have corridor solids remain dynamic to changes in the corridor. As a result, corridor solids can now include material, classification code, volumes, and more information. You can use this info throughout the design workflow, including design making and construction planning.



Property set definition:

Manually add property data to any drawing objects—including Civil 3D objects—and leverage it in other downstream applications in the design workflow, including **Navisworks project review software** and **BIM 360 Glue BIM construction collaboration software**.

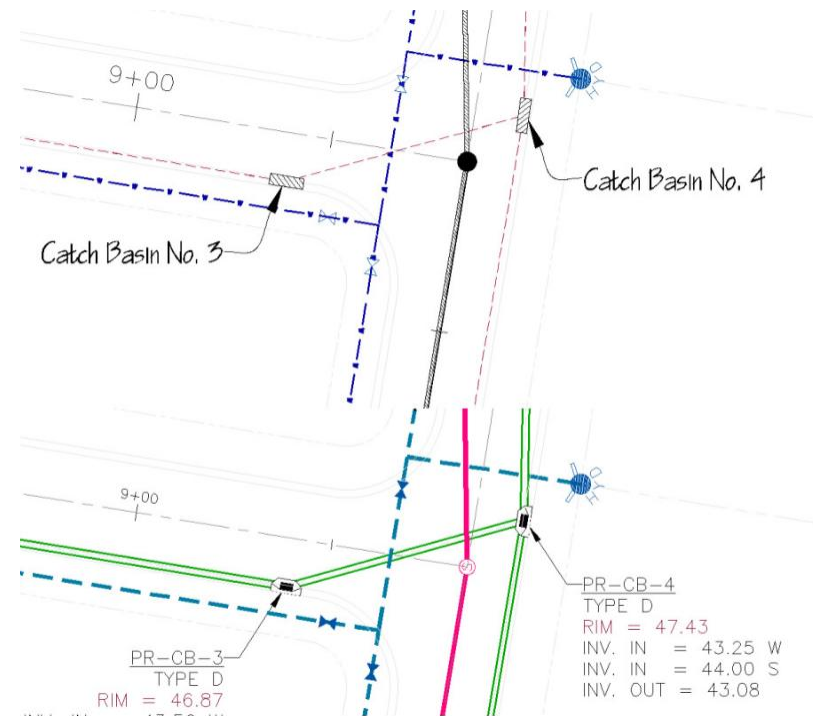
New in 2017



Drafting standards:

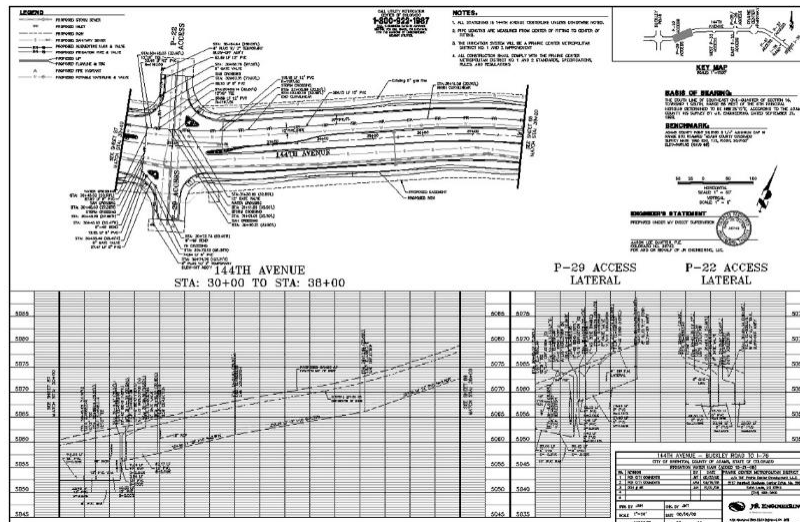
Use the extensive library of FDOT CAD styles in for your civil drafting and documentation needs. Control colors, linetypes, contour increments, and labeling by style.. Share drafting and design standards across organizations with style management tools. **(FDOT Civil 3D State Kit)**

- Label the locations in profile and section views where gravity pipes and pressure pipes cross an alignment, or a sample line or alignment.
- Label locations in section views where pressure pipes cross a sample line.
- Specify the direction of the section in the section view grid.
- See section views Left to Right and Right to Left.
- Specify the elevation values in order to improve visibility in the section view.



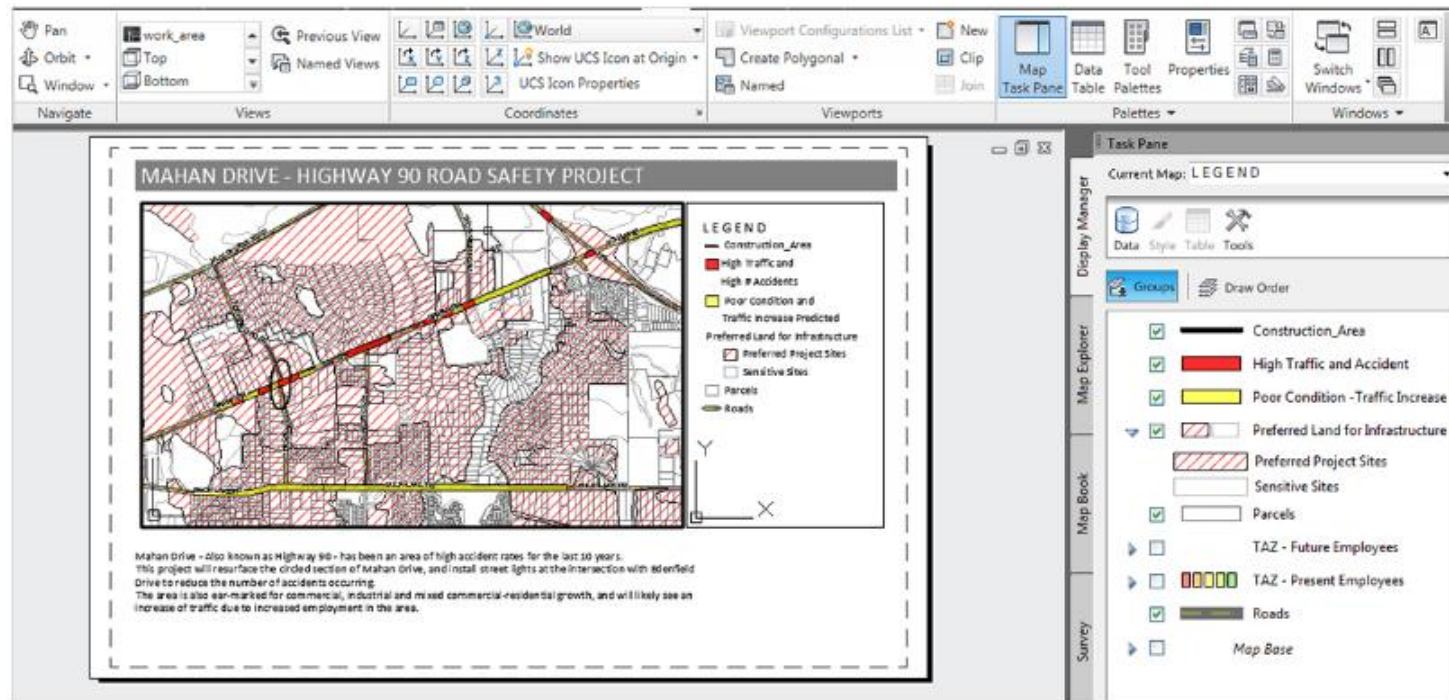
Construction documentation:

Generate production plans, including annotated section sheets, profiles, and grading designs. Automate typical drafting while better maintaining drafting standards with the styles-based drafting environment. Use Xrefs and data shortcuts to generate drafting across multiple drawings, resulting in a workflow that enables production sheets to use a single instance of the model. Synchronize production sheets to reflect changes to the model.



Map production:

Use mapping functionality to create maps that highlight specific features or information, such as flood zones, pipe sizes and material, soil types, wetland boundaries, and zoning districts. Create legends and reuse mapping styles to help streamline map creation



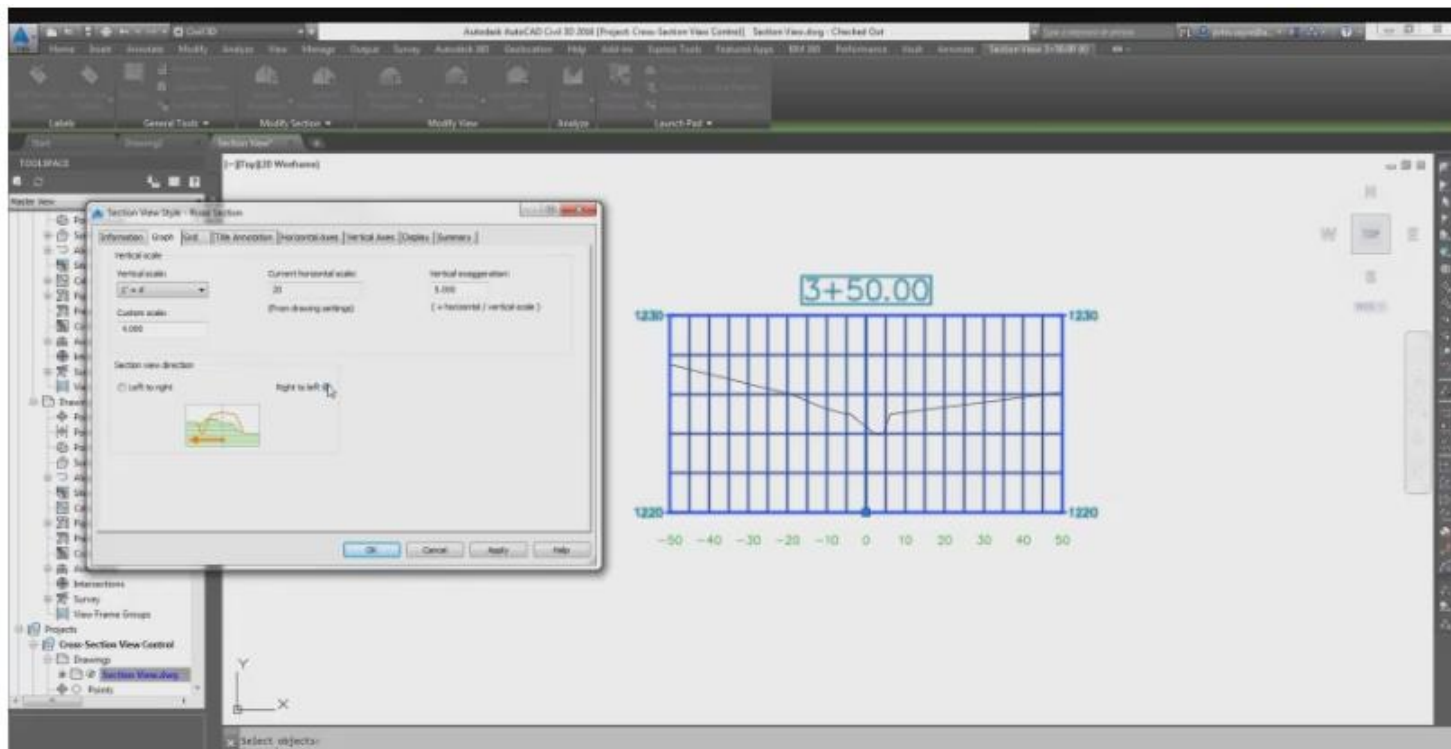
Reports and tables:

Gather real-time quantitative information from your model using dynamic tables for linework, volume information, and more. Harvest quantities, earthwork, and stakeout information using a broad collection of standard reports, or create your own custom report to help meet your submittal requirements



Cross section view control:

Specify the direction of the section in the section view grid. View section views Left to Right and Right to Left. Specify the elevation values in order to improve visibility in the section view.



Features

GPS surveying tools for faster processing:

View in Civil 3D images of surveying, data collection, and mapping features. GPS surveying and data collection tools in Civil 3D can help you update your processes for improved project delivery.

Data access and exchange:

Read, write, and convert data between widely used formats. Access aerial and satellite imagery and connect to web mapping and web feature services to take advantage of publicly available data. Import and export between GIS, CAD, and other GPS surveying formats, including: ASCII; DWG; ESRI SHP, E00 and Arc/Info coverages; LandXML and GML; MapInfo MIF/MID and TAB; MicroStation DGN; Oracle; Ordnance Survey MasterMap (DNF) (GML2, read-only); SDF and SDTS (read-only); and Vector Product Format (VPF, read-only).

Point clouds

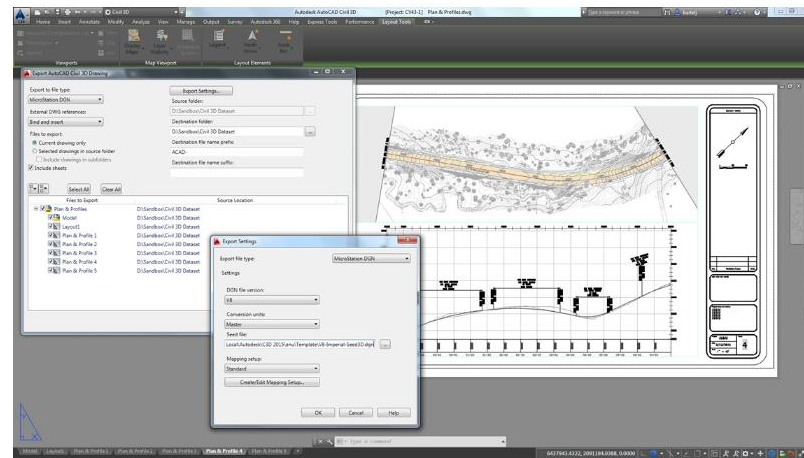
- Gain more functionality to use and visually display point cloud data.
- Re-create referenced objects or insert additional models.
- Attach point clouds to drawings and use as a guideline for drawing, change display, or apply a color stylization to distinguish features.

Surfaces:

- Create TIN surfaces from point cloud files.
- Generate surfaces from one or multiple point clouds, and select specific areas within point clouds.
- Adjust the default distance between points to change the percentage of points that will be included in the surface.

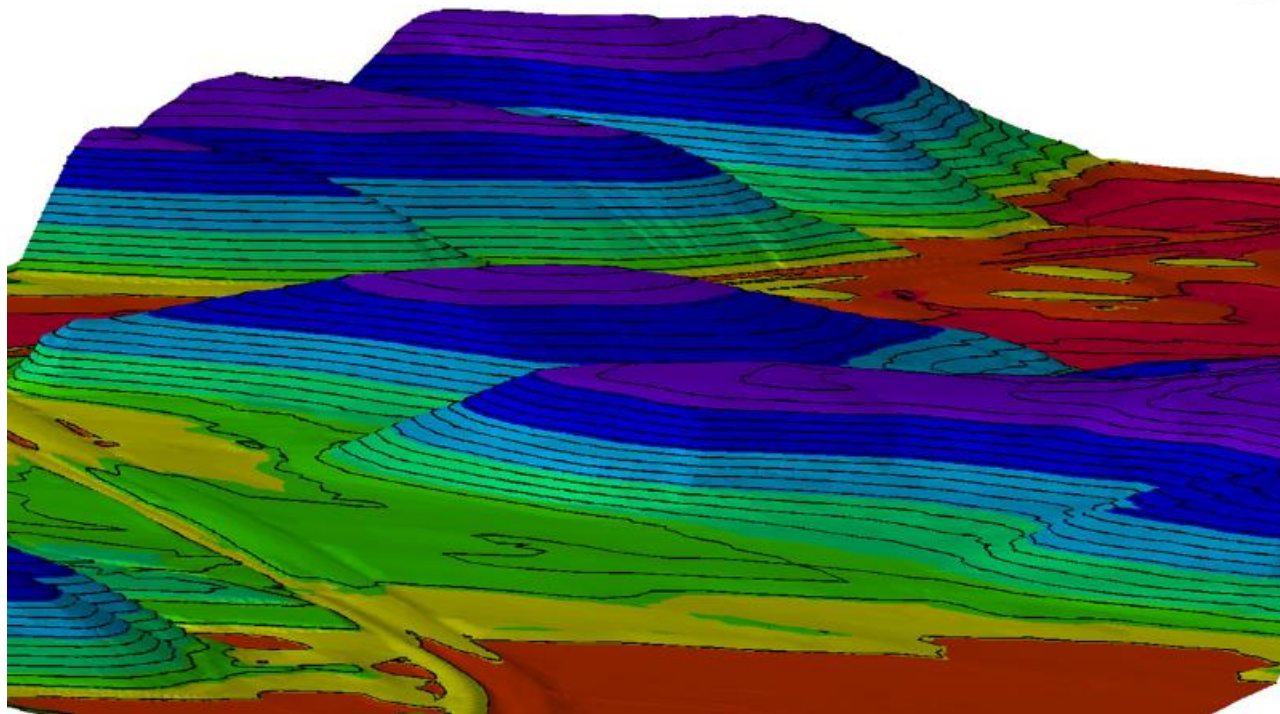
Industry Foundation Classes (IFC)

- IFC file format offers an interoperability solution between software applications.
- Export drawings to other IFC-certified applications, and import IFC files to create and work in DWG™ format.
- Export drawings to other IFC-certified applications that could not otherwise open a DWG file.
- Import an IFC file to create and work in a DWG file that was originally created in a format other than DWG.



Surface modeling:

Terrain creation tools support a wide variety of surface data including DEM, LIDAR (light detecting and ranging), SHP, and ground survey. Handle large surfaces and develop a deeper understanding of the terrain while creating dynamic analysis, labeling, and documentation. Get real-time feedback on design performance such as earthwork quantities, steep slopes, and drainage patterns.

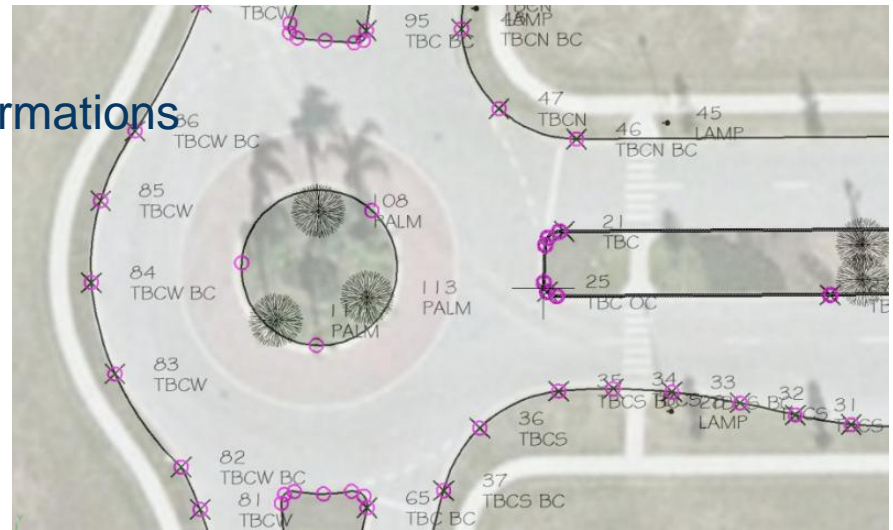


Base map creation:

Survey functionality is fully integrated into workflows. A more consistent design environment enables you to use points, survey figures, and surfaces throughout the design process without having to manually translate coordinate systems or transfer data from a survey package to your civil engineering design software. Introduce GPS survey data into a project, and design elements update automatically.

Further capabilities include:

- Direct import of raw survey data
- Coordinate system settings and transformations
- Editing of survey observations
- Automated creation of survey figures
- Surface creation



Reality capture:

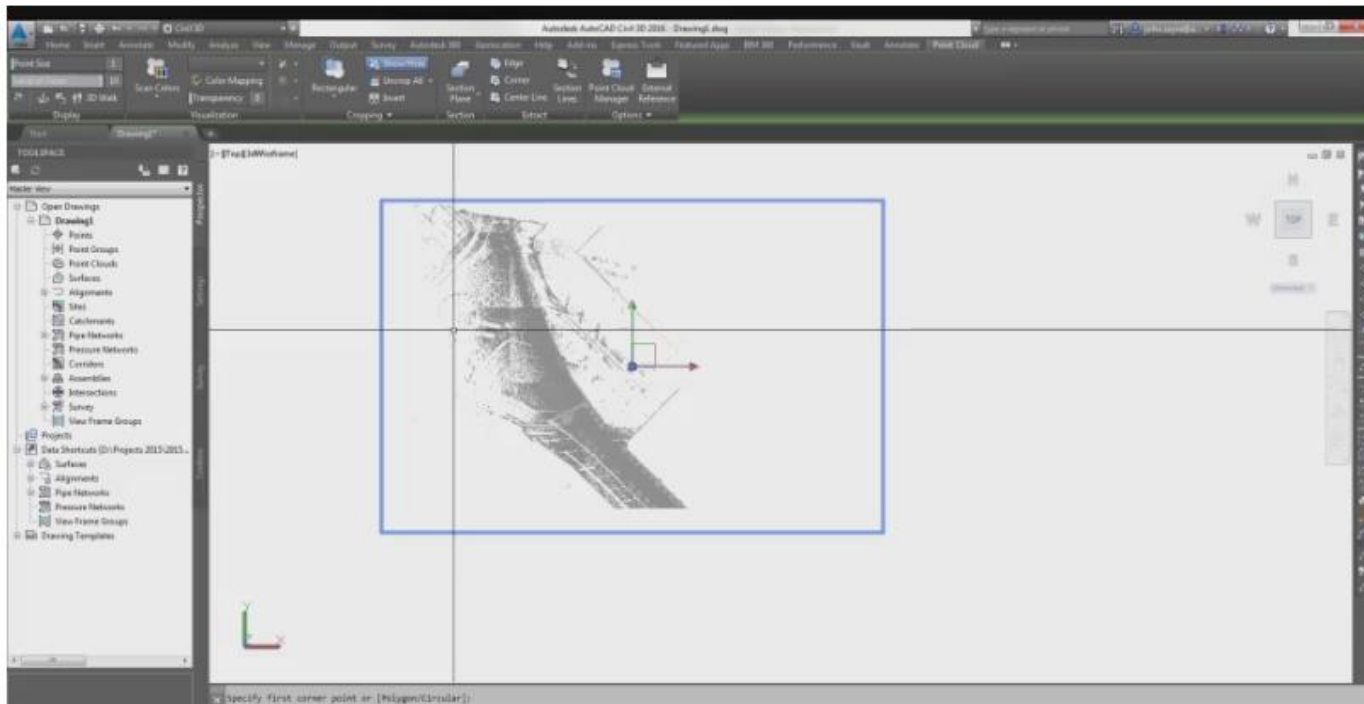
Create point clouds using data from LIDAR (light detecting and ranging) scanning. Use point cloud tools to import and visualize point cloud information; stylize point data based on LAS classifications, RGB, elevation, and intensity; use data to create surfaces; perform site surveys; and digitize as-built features for civil engineering design projects. You can create Civil 3D surfaces from point cloud data.

- Create TIN surfaces from point cloud files
- Generate surfaces from one or multiple point clouds
- Select specific areas within point clouds
- Use filtering options to delineate ground and non-ground points



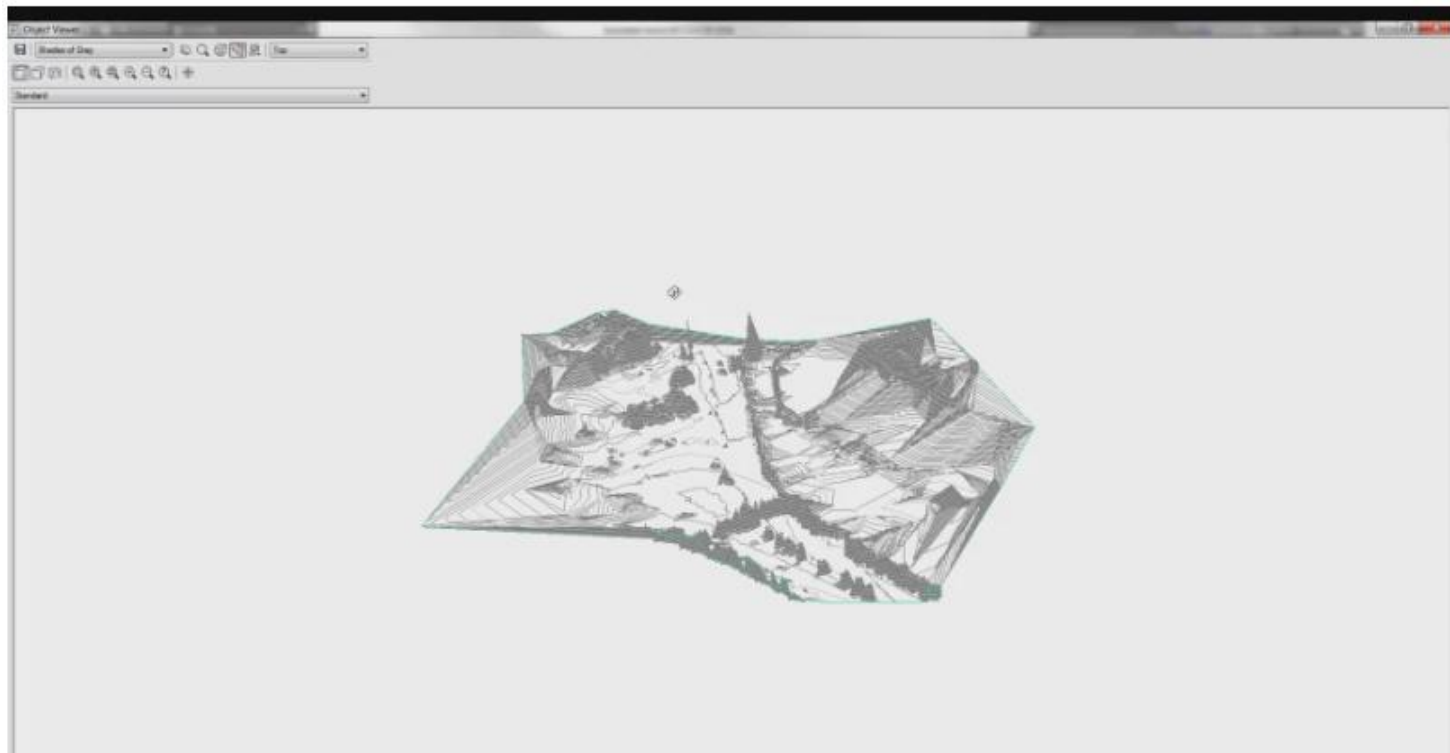
Point clouds:

Take advantage of enhanced AutoCAD tools, including point cloud object snaps, point cloud crop states, and an addition to the point cloud manager that displays the on/off buttons for scans and regions. Re-create referenced objects or insert additional models. Attach point clouds to drawings and use as a guideline for drawing, change its display, or apply a color stylization to distinguish different features.



Surface creation from point cloud data:

Create TIN surfaces from point cloud files. Generate surfaces from one or multiple point clouds. Select specific areas within point clouds, and use filtering options to delineate ground and non-ground points. Adjust the default distance between points to change the percentage of points that will be included in the surface.



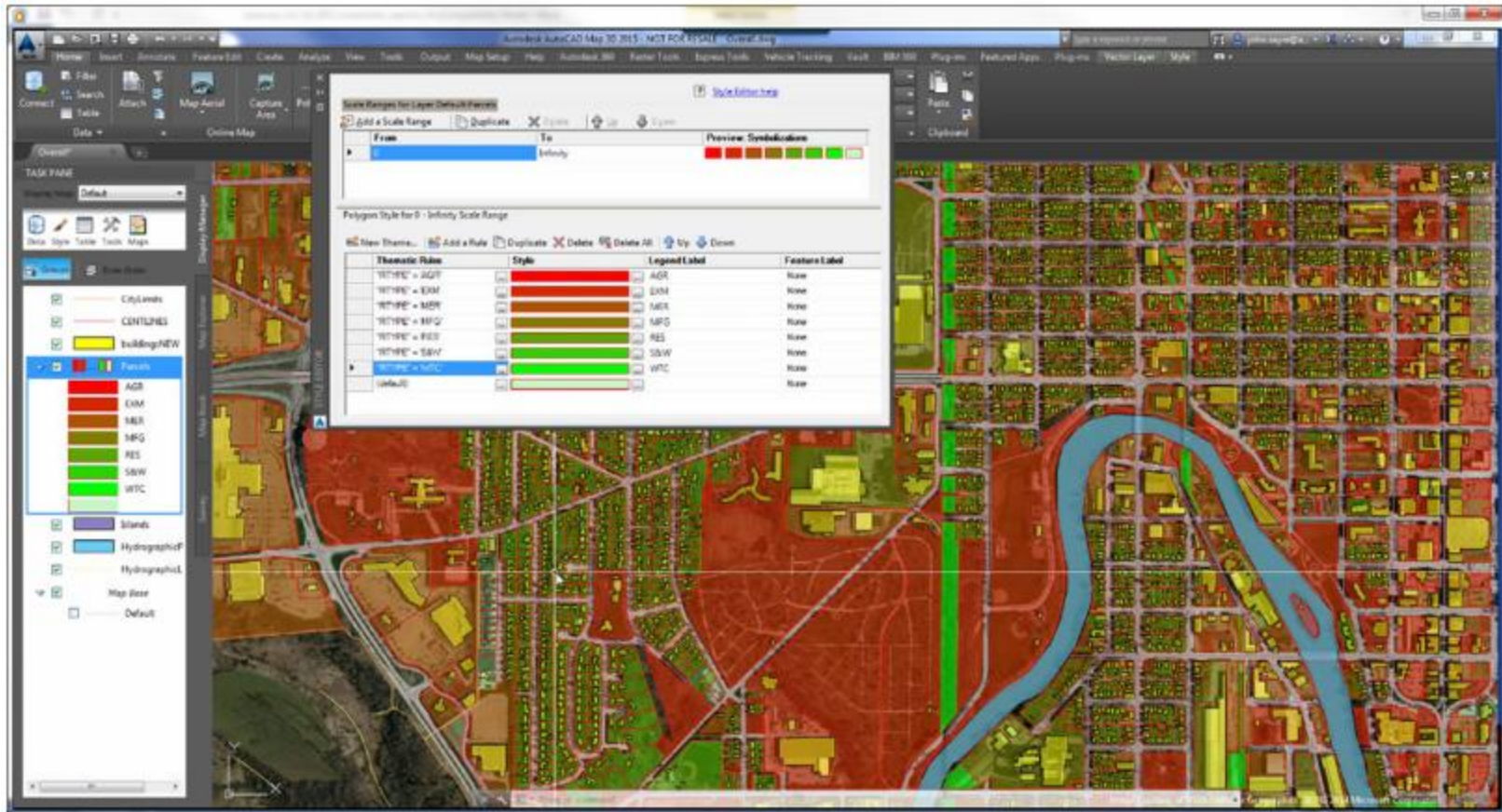
Features

Integrated stormwater management and geospatial analysis:

Improve project delivery and make more informed decisions using visualization, simulation, and water analysis integrated with the design process for stormwater management, geospatial analysis, and model analysis.

Geospatial analysis:

Take advantage of geospatial analysis capabilities to help inform planning studies. Use the advanced geospatial functionality to perform spatial queries, create thematic maps, and conduct buffer, tracing, and overlay analysis.

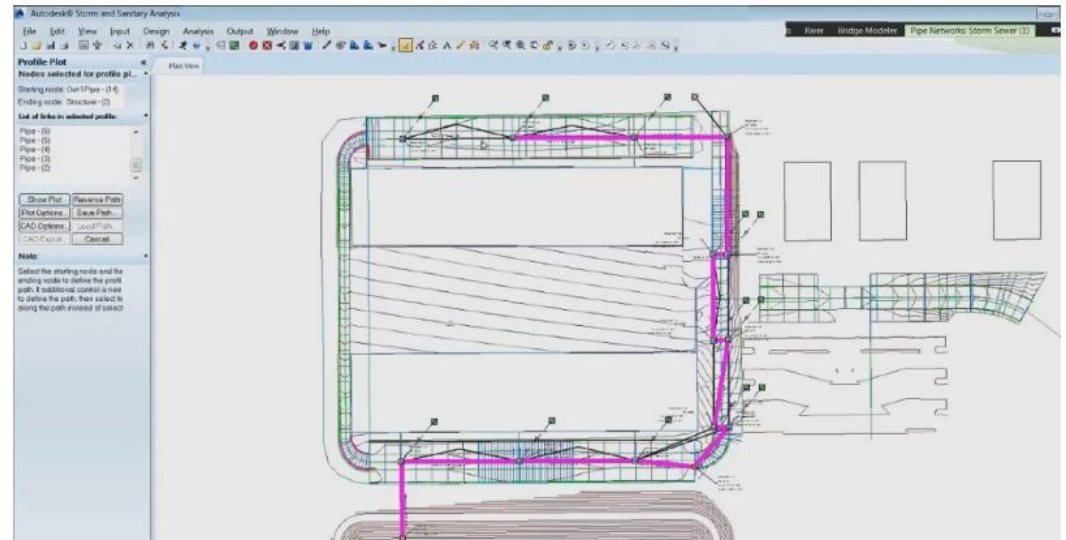


Storm and Sanitary Analysis:

Storm and Sanitary Analysis software is included in AutoCAD Civil 3D and all editions of Infrastructure Design Suite. Dynamic model elements are not limited to design and construction documents. Create more design scenarios while keeping the model up-to-date. Perform water analysis much earlier in the design process for multiple types of projects.

Design and analyze:

- Stormwater drainage network systems
- Highway storm drain catch basins and culverts
- Sustainable stormwater management
- Detention pond and outlet structure



Model analysis:

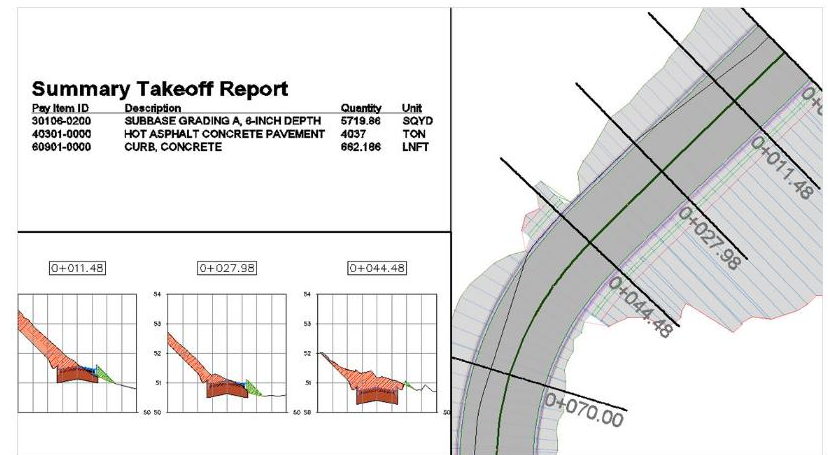
Minimize redundancy in your workflow by analyzing the model you've already built. Get feedback in real time as you refine the design. Use slope, elevation, and contour analysis to better understand of your surface model. Mass haul and earthwork features help contractors and engineers plan the movements, amounts, and placements of material during construction.

As designs change, quickly generate mass haul diagrams to help:

- Analyze cut and fill balance point locations
- Determine the amount and direction of material to be moved
- Identify borrow pits and dump sites

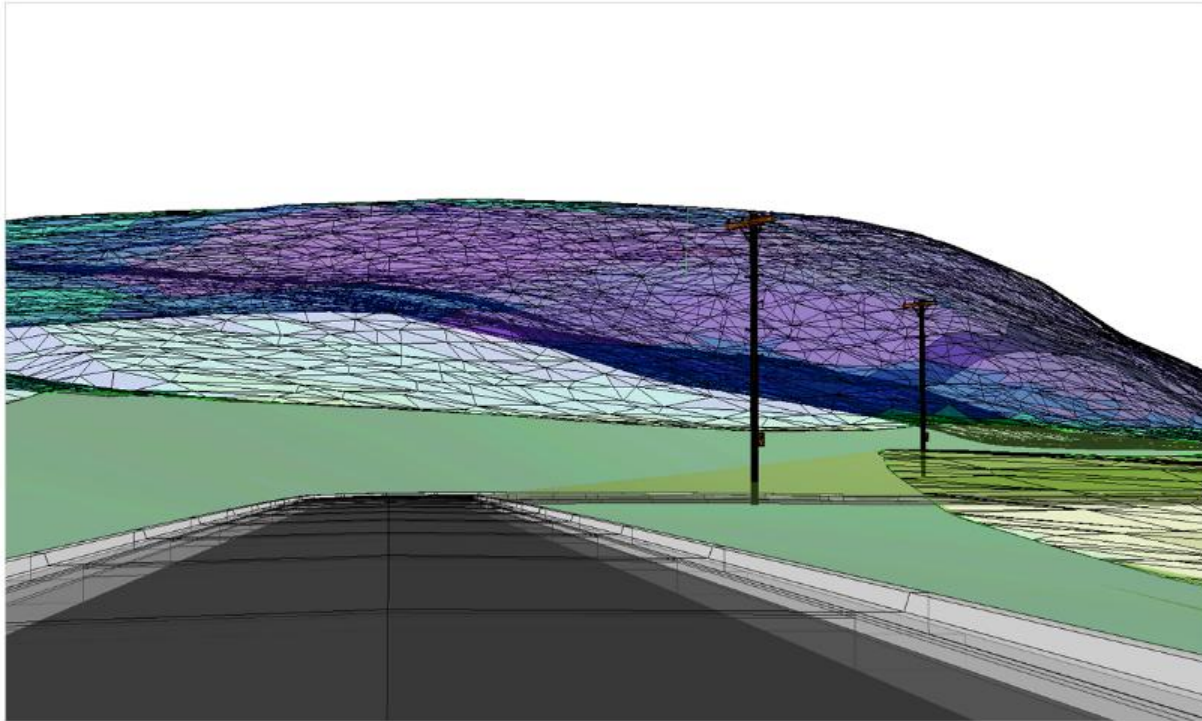
In addition to earthworks, you can import customizable pay item lists for use in assigning pay item values to objects in the drawing.

Automatically calculate quantities and generate reports based on pay item assignments.



Visual analysis:

Develop reproductions of corridor models using render materials that correspond to corridor elements, such as asphalt or concrete. Use line-of-sight tools, including point-to-point and sight distance along a corridor, to visually inspect the 3D models. Use the IMX import/export functionality between AutoCAD Civil 3D and **InfraWorks 360 software** products for additional visual analysis.



Features

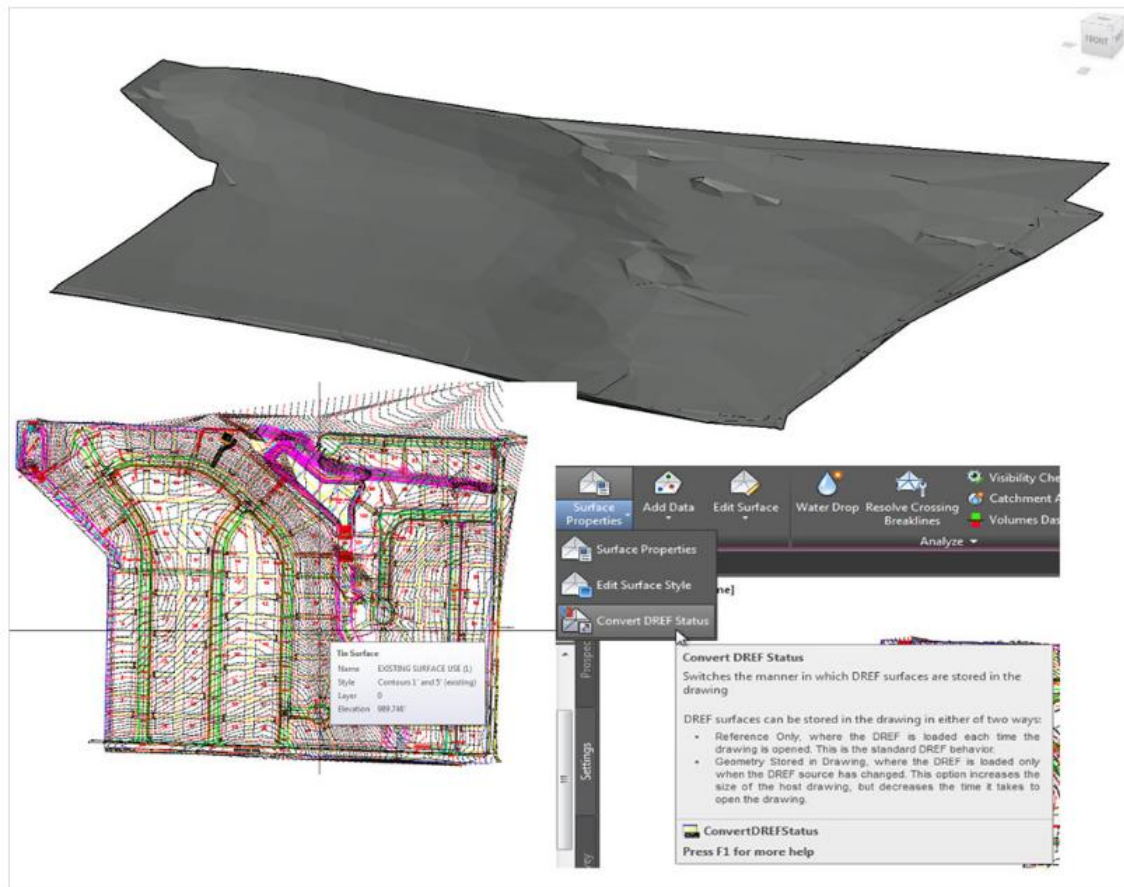
Engineering collaboration workflows:

Tools and products that support engineering collaboration workflows to help you overcome the challenges within civil projects.

Cache DREF surface:

Now, you can save the geometry of a reference surface in the drawing that contains the data shortcut reference. This capability increases the performance of the drawing. It also eliminates possible issues that may arise when opening drawings in applications other than AutoCAD Civil 3D.

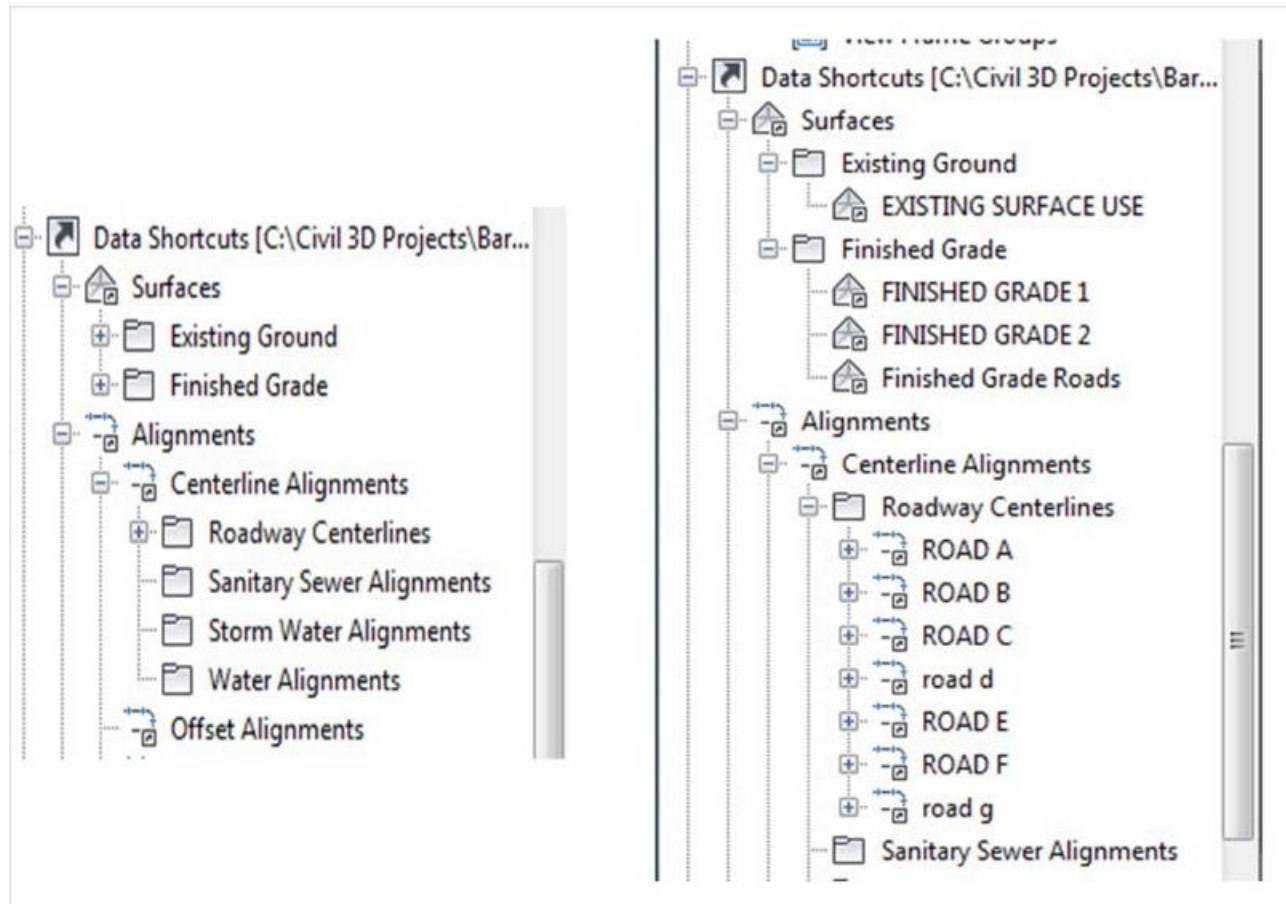
New in 2017



Subfolders for objects:

Create subfolders for objects and data shortcuts within Prospector. Simply right-click an object collection or a data shortcut collection. Then, click Create Folder. Drag existing objects into the new folders, and nest folders inside other folders.

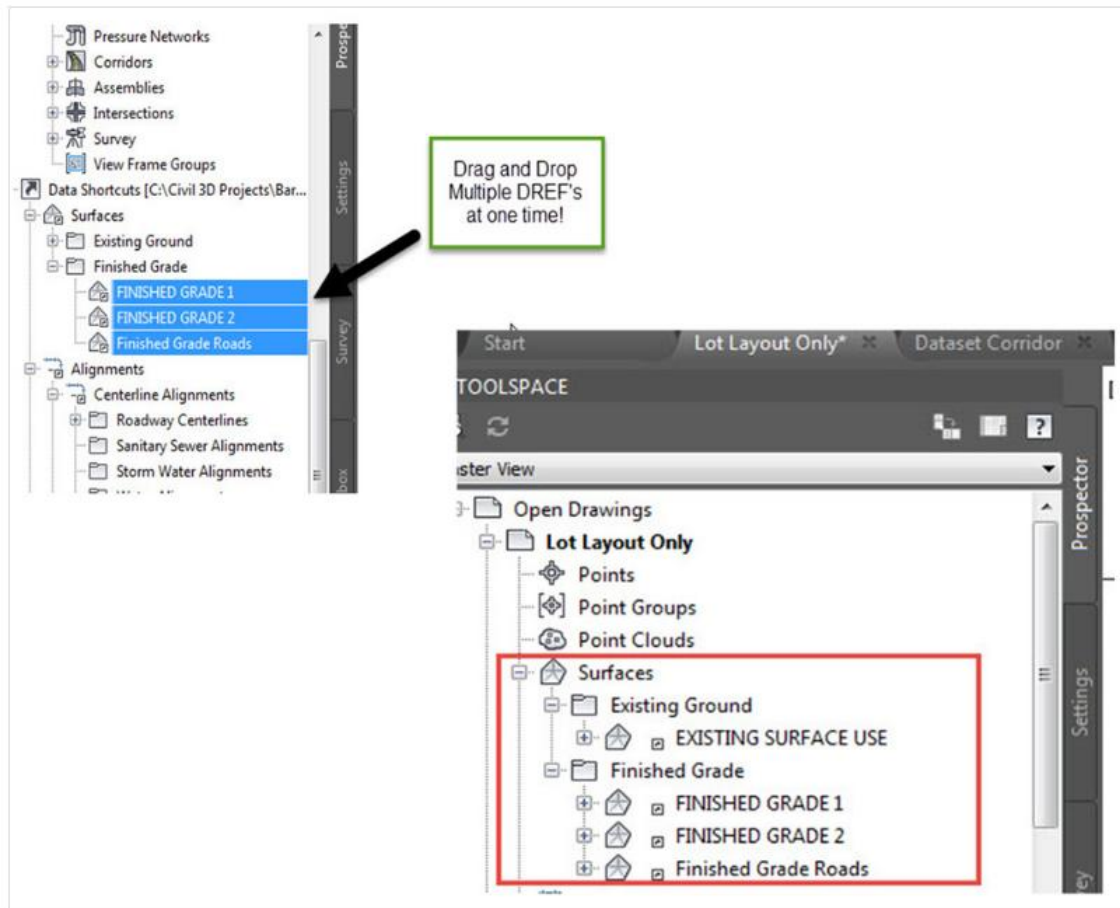
New in 2017



Streamlined creation of references:

You can now create multiple data shortcut references at once by either right-clicking the data shortcuts and selecting the Create Reference command, or by selecting them and dragging them into the drawing.

New in 2017



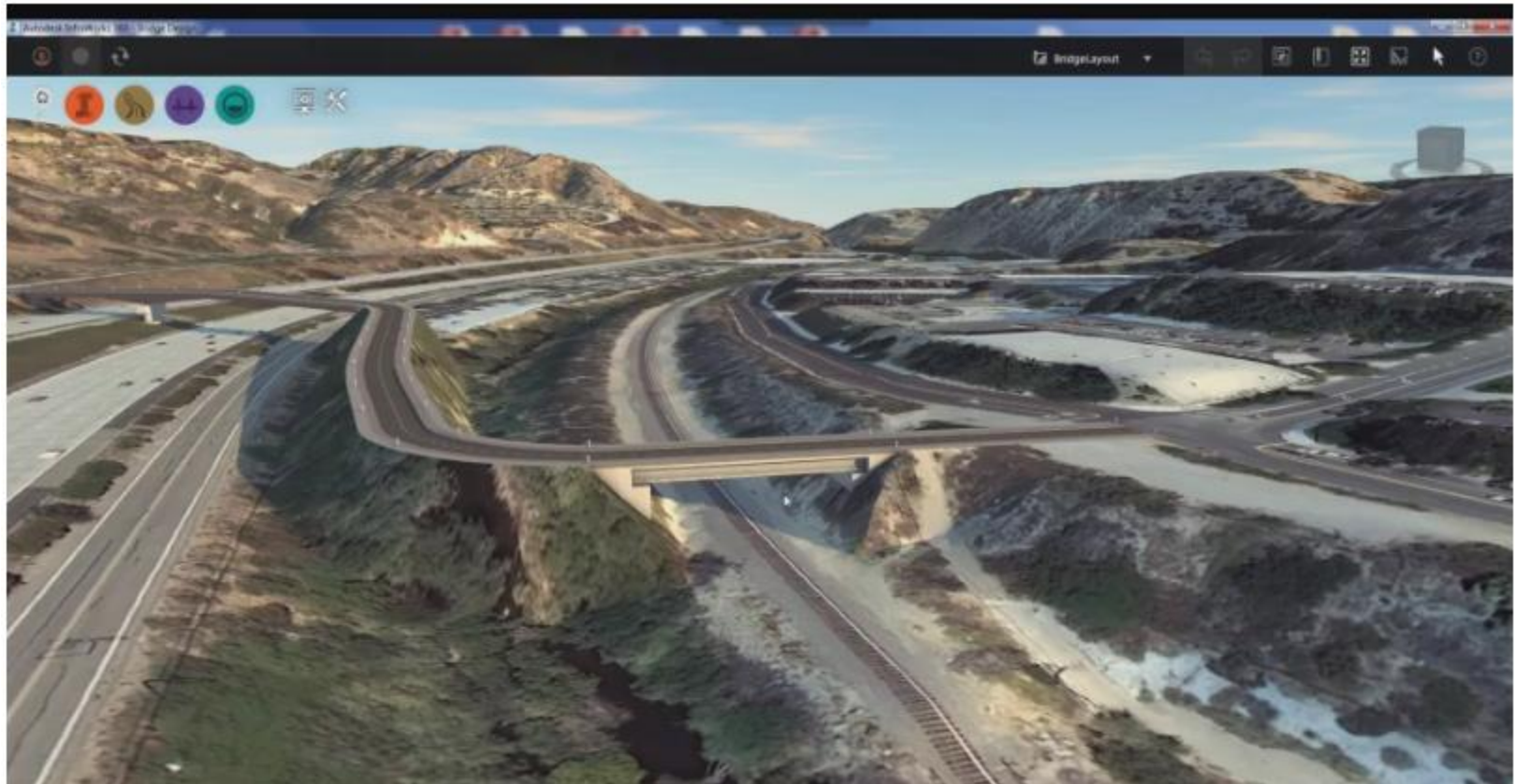
AutoCAD Civil 3D with InfraWorks 360:

Use **InfraWorks 360 preliminary design software** models inside of AutoCAD Civil 3D. Then, take design data back to the InfraWorks 360 model. Incorporate surfaces, the planning and designing of roads, intersections, drainage networks, and bridges created in InfraWorks 360. Link the Civil 3D drawing as a data source to populate the InfraWorks 360 model with detailed design. Use configuration settings to define how InfraWorks objects map to Civil 3D styles at import.



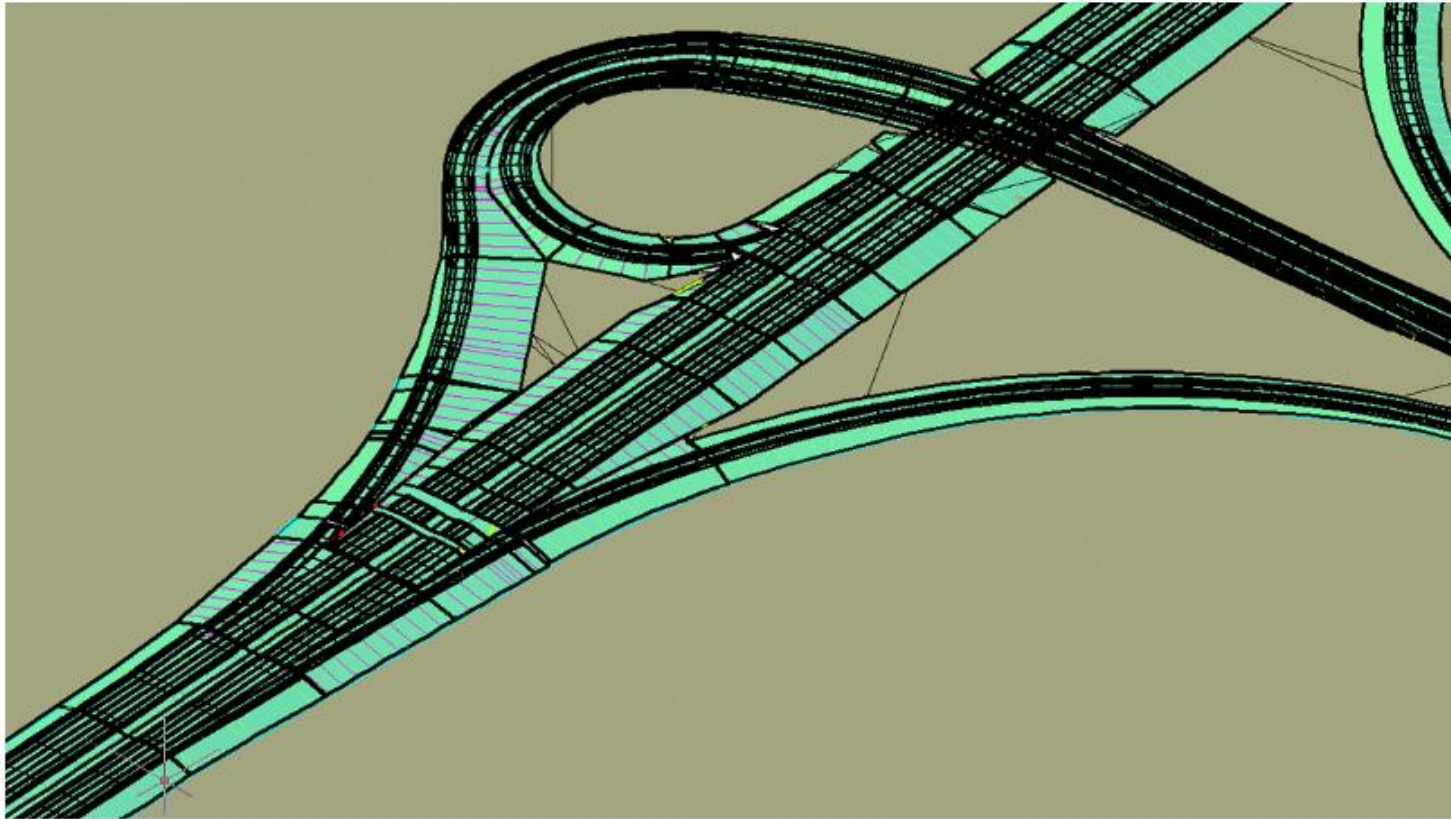
Bring InfraWorks 360 bridges into Civil 3D:

Bring InfraWorks 360 bridges into AutoCAD Civil 3D as 3D solids where it can be used as a reference for design of adjacent road and site features and also included in production drafting including section and profile sheets.



Prior version compatibility:

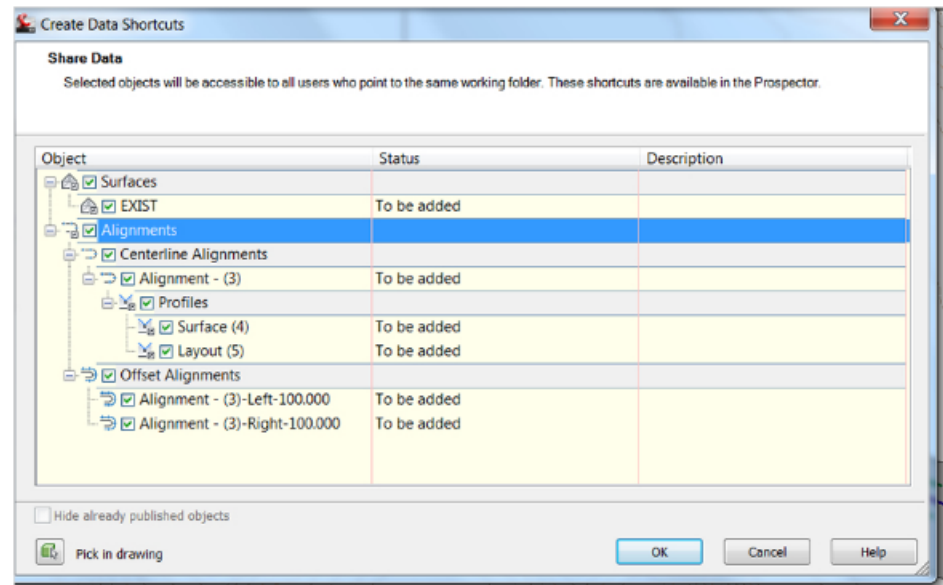
Open AutoCAD Civil 3D 2017 drawings in AutoCAD Civil 3D 2016, 2015, and 2014 civil engineering software.



Data shortcuts and references:

Connect FDOT project teams by working from the same consistent, up-to-date project model from survey through construction documentation. Using data shortcuts and Xrefs, team members can share model data—such as surfaces, alignments, and pipes—and use one design object for multiple design tasks. For example, if a surveyor creates the existing ground surface, designers can connect to that data in parallel to design the road or parcel layout. Drafters can generate annotation from the data shortcuts or directly through an Xref to keep production drafting in sync.

- Replace drawing objects with data shortcut references
- Manage and repair broken data shortcuts
- Associate drawing objects to data shortcuts



3D Task Team

Agenda topics:

Agenda topic *Introduction*

Goal of this meeting is to determine what the technical obstacles are to go to 3D design and then determine when we implement.

Agenda topic *Survey*

Required DTM

What levels of survey? LiDAR, cut cross sections. Created a 3Dimensional base.

RRR jobs

Deliverables – What does the designer need?

Agenda topic *Design*

•Contract Scope of Services.

- How should scope of service be written to address the requirements for 3D?
- Do we need to define level of model for different types of projects (PD&E studies, resurfacing, widening, reconstruction, new alignments, etc)?
- As a Design tool, are we modeling the entire project anyway? Considering the industry is trending towards providing models that contractors will use “out of the box”... maybe providing a complete model (including ADA Ramps, etc.) as a means of providing more accurate quantities and to better convey intent is the way to go.
- Do we need to define what is required for each phase submittal?
- Any issues with the estimated quantities coming from the model?
- QA/QC for the model... What is best way to accomplish this? How is it documented?
- Currently CADD manual requires Land XML file format. Do we need to *update to include DXF and pursue ICM format? Is IFC the future, as it is more robust? Land XML is good for now...*

What are some of the topic's FDOT personal are talking about in regards to Civil 3D?

One the most discussed topic's is **Automated Machine Guidance**.

Civil 3D creates three-dimensional (3D) models of transportation features while maintaining dynamic relationships to source data such as grading objects, breaklines, contours, and corridors.

From these models such as a corridor model, surfaces can be extracted and then can be exported into various formats that **Automated Machine Guidance systems** can use.

Automated Machine Guidance example:







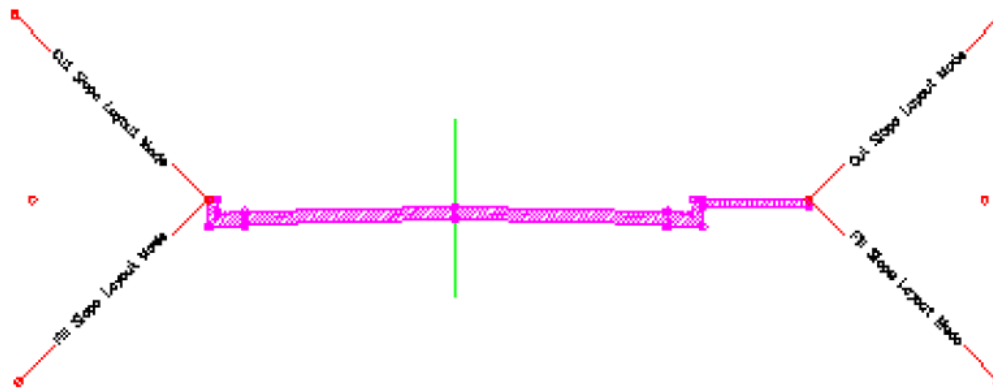






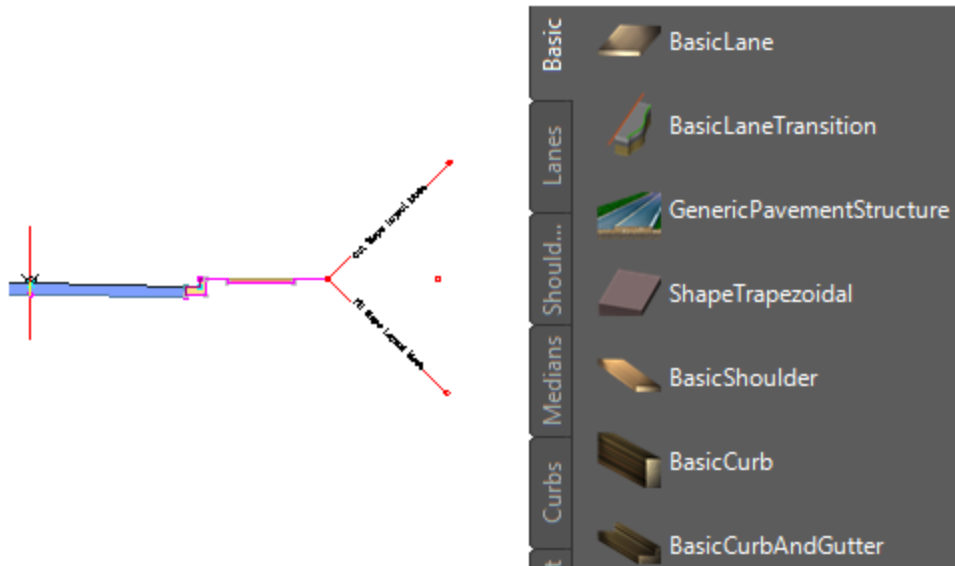
Another area of discussion is the Creation of Assemblies in Civil 3D.

Assembly objects contain and manage a collection of subassemblies that are used to form the basic structure of a 3D corridor model. An assembly is an AutoCAD Civil 3D drawing object (AECCAssembly) that manages a collection of subassembly objects. Together, assemblies and subassemblies function as the basic building blocks of a roadway or other alignment-based design. An assembly object must be applied along an alignment to form a corridor, and it can reference one or more offsets.

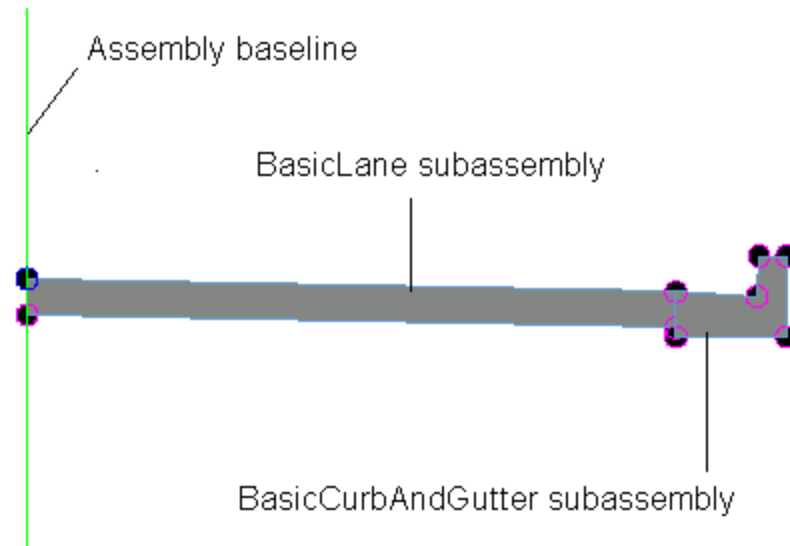


Adding one or more subassembly objects, such as travel lanes, curbs, and side slopes, to an assembly baseline creates an assembly object. This forms the design for a corridor section. The subassemblies are provided in a set of catalogs. Roadway assembly (left), with subassemblies shown in a tool palette (right)

Adding one or more subassembly objects, such as travel lanes, curbs, and side slopes, to an assembly baseline creates an assembly object. This forms the design for a corridor section. The stock Civil 3D subassemblies are provided in a set of catalogs. Roadway assembly (left), with subassemblies shown in a tool palette (right)



The following illustration shows a simple assembly object that represents one side (lane) of a two-lane road. Subassembly objects named BasicLane and BasicCurbAndGutter have been added to a baseline alignment, forming a single travel lane with a curb and gutter.

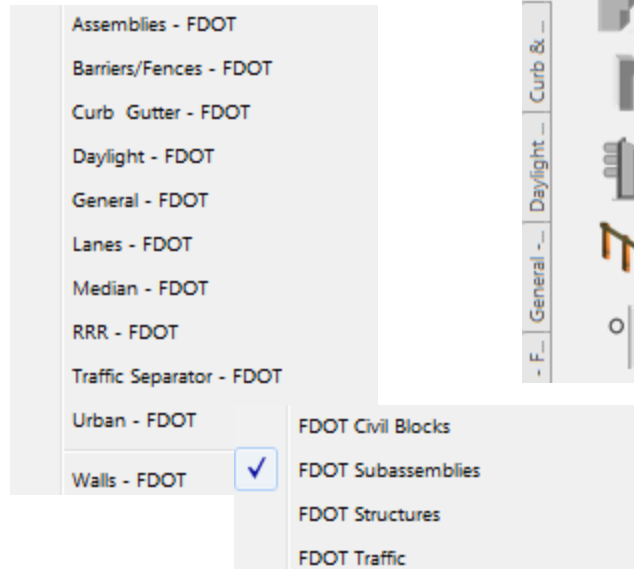
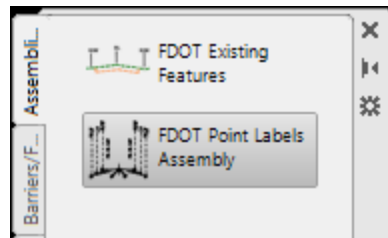


As we discussed earlier the FDOT Civil 3D State Kit contains many FDOT specific Assemblies and Subassemblies:

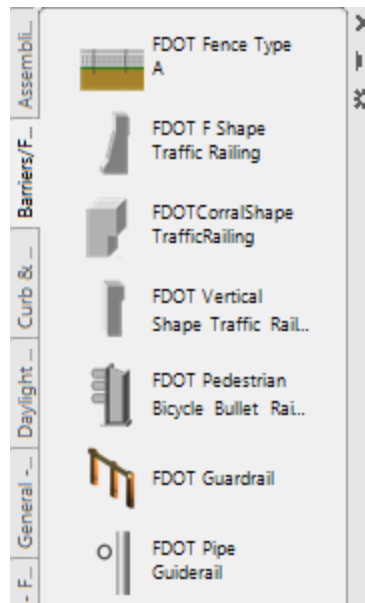
FDOT Tool Palette: Subassemblies Tabs:



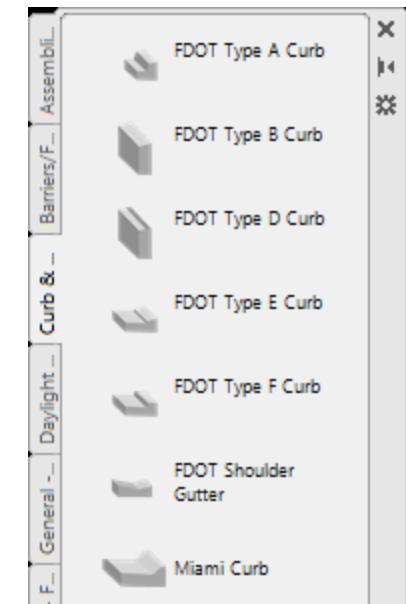
Assemblies



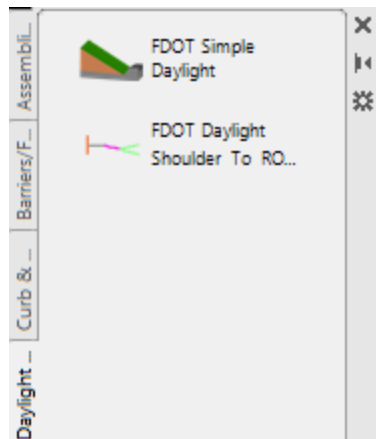
Barriers & Fences



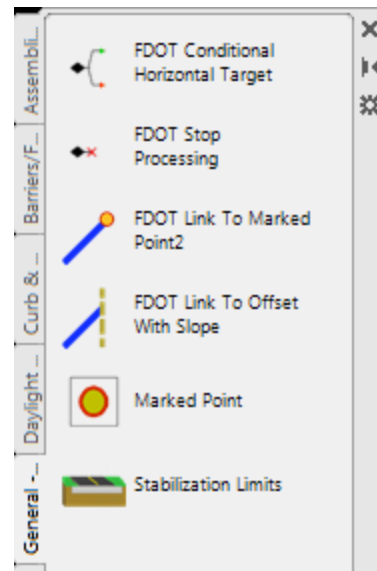
Curbs & Gutters



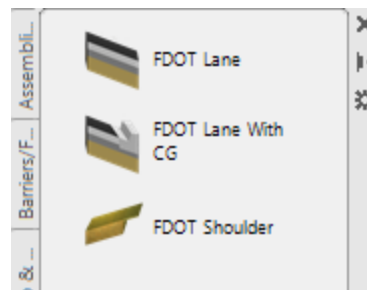
Daylight



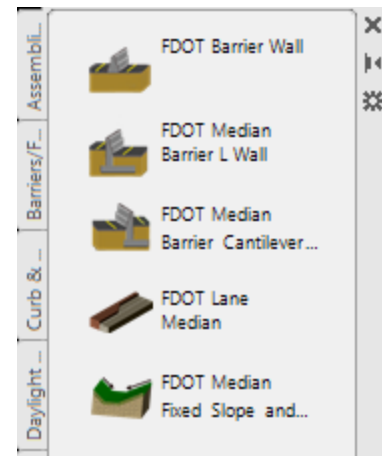
General



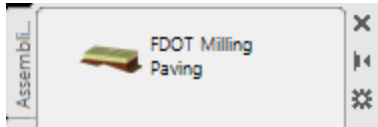
Lanes



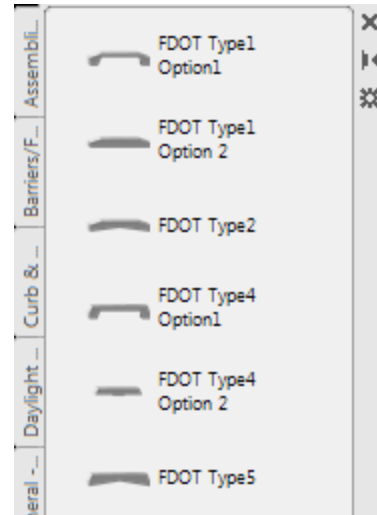
Medians



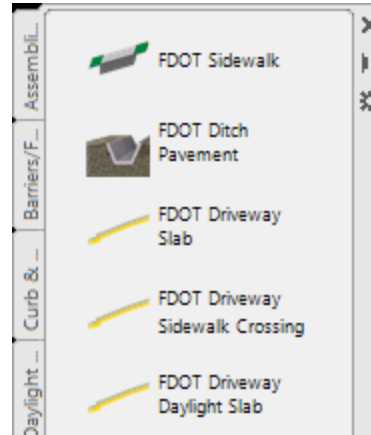
RRR



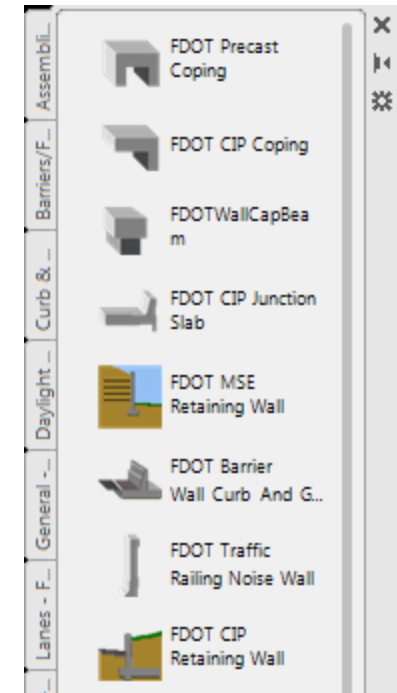
Traffic Separator



Urban



Walls



So what's the take away from today's session:

Civil 3D and the FDOT Civil 3D State Kit is:

A mature established stable CADD platform.

Creates three-dimensional (3D) models of land and transportation features while maintaining dynamic relationships.

In **2012** the FDOT announced that Civil 3D projects completed using the FDOT Civil 3D State Kit would be accepted as one of the two CADD platforms for project deliverables.

Civil 3D training for FDOT district personal has been on going sense **2011**.

FDOT Consultants are wanting to do projects on the Civil 3D platform.

When a new CADD project is being setup, you have a choice:

Create FDOT Project (Version 6.1.1.28)

Project Type
This application can create both AutoCAD and Micro-Station FDOT projects. By selecting the type of project you wish to create, the application can setup the appropriate directory structure and the other required components specific the type of project selected.

☒ **FDOT AutoCAD Civil 3D Project** ☐ **FDOT MicroStation Project**

Parent Container Directory
The Parent Container Directory is the root directory that holds your new and existing projects. Once you click the "Create Project" button, your new project directory and its corresponding sub-directory structure will be created under this parent container directory.
(Example: C:\e\projects)

Parent Directory: C:\Civil 3D Projects\

Financial Project Information
The financial project information is used to generate the Financial Project Identifier (FPID). New projects will always be created under the Parent Container Directory in a new directory named from the concatenation of the financial project information fields.

Item: **Segment:** **Phase Group:** **Phase Type:** **Sequence:**

Contract Information
Contract Number: **Contract Date:** Thursday . June 09, 2016
☐ In-House Contract (FDOT)

Project Description
General Description

Cancel Finish

Required Fields

If you're a project manager and you've not yet used Civil 3D on an FDOT project, take a look at Civil 3D it might be the right choice for your project.

With Civil 3D your projects can:

Be Delivered “On Time” and “On Budget”

Thanks! for attending today's session:

Civil 3D for Project Managers

Randy Roberts - FDOT Production Support Office | CADD

Doug Medley – CADDESK Consulting Resources, LLC

